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## The Canadian Mining Journal

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Editor

J. C. MURRAY. B.A., B.Sc.

Contributing Editor

H. MORTIMER-LAMB

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#### CIRCULATION.

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## THE INTERNATIONAL GEOLOGICAL CONGRESS.

The first circular issued by the secretary of the International Geological Congress Committee has just been received.

As our readers know, the Congress will hold its twelfth meeting in Canada next August. Toronto will be the place of meeting. Before, during and after the meeting excursions will be organized.

Brief mention of these excursions, which will constitute the most important feature of the Congress, is not out of place.

The pre-meeting excursions are twelve in number, and are so arranged as to give the delegates the choice of examining one or more localities of geological and mining importance. For instance, although it will not be practicable for one person to join more than two or three of these excursions, yet he can readily make his plans so that he will see interesting mines or geological exposures at various places all the way from Halifax to Toronto. The geologist, the paleontologist, and the mining engineer, can pick his route to suit himself, although, of course, all three will overlap to a greater or less extent.

To the Maritime Provinces ten days are to be devoted; to the Haliburton-Bancroft area, Ontario, nine days; and to the Sudbury-Cobalt-Porcupine regions, twelve days. These longer journeyings are booked for about the same date, but there are nine shorter trips, one day to three days, from which those who participate in the former may choose.

During the period that the Congress is in session, in Toronto, a number of visits will be paid to places within easy reach of the city. As the session lasts for eight days, there will be ample time for these.

Immediately after the meeting four transcontinental excursions will leave Toronto. The details in these instances are being carefully elaborated. The delegates may travel over the C.P.R., the C.N.R., or the G.T.P. A great range of choice has been provided, and it is expected that not a few of the visitors will take advantage of the occasion to visit northern British Columbia and the Yukon, in addition to crossing the continent.

It may be noted here that the railway and steamship companies have expressed their willingness to do all that lies in their power to aid the excursionists. This means much. Every effort will be made to cut down expenses and to provide for the comfort of the visitors.

The meeting of the Congress will be an event of world-wide importance. Before the last meeting in Sweden, the Executive Committee compiled a monumental series of volumes on the iron ore resources of

the world. The coal resources of the world will be similarly dealt with for the approaching Congress. The volumes are now in course of preparation, and it is expected that they will be ready for distribution before the Congress meets.

Coal, however, will not be the only topic of discussion. Such subjects as the differentiation in igneous magmas, the influence of depth on the character of metalliferous deposits, the origin and extent of the pre-Cambrian sedimentaries, etc., will be threshed out. Thus the mining engineer will hear much that has a direct bearing upon his work, despite the fact that the Congress is primarily a gathering of geologists. In fact, every effort is to be made to make the proceedings interesting in the widest sense to both geologist and mining engineer. And, possibly, Toronto can show cause why this should be.

### THE PANTOLOGIST.

Seldom have we been favoured with a gem of purer ray serene than that forwarded to us to-day simultaneously by several subscribers. It is a circular letter, typed on the paper of a well-known Toronto hotel, and written by a person with whom we unfortunately are not acquainted.

The only unremarkable parts of this efflorescent effort are the words "Dear Sir," "Respectfully submitted," and the name. After reading the letter (and it grips the imagination from start to finish), it is borne in on us that "Respectfully submitted" is quite out of place. There is neither respect nor submission in the document. But there is much else that may be touched upon.

The letter opens with a generous offer of the writer's services "in an advisory capacity." This offer, be it remembered, is being sent to consulting engineers. "If I cannot save you money, I will not charge you a cent. I have had a thorough training in *every branch* of the industry and can give you the best of references." (The italics are our own.) "Below," continues our hero, "I suggest *several avenues* of expense, which can be *materially decreased and is well worth the small price of an expert.*" (Again the italics are ours.)

Then follow such sizzling suggestions as: "One of your big items of expense in excavating is powder. If your miners make eight or nine holes to a round where five would do, if properly set, you lose the power, and time involved in making the needless holes." This scintillating discovery is equalled only by a subsequent statement that, "All ground breaks different." Do tell We feel that ourselves and all our subscribers are getting priceless pearls of practical experience for less than nothing! It's like depriving a sucking child of its nutriment! It's not fair! But it doesn't end here. Not at all. Listen again.

"Is your timbering done in the most economic manner? This is a big item of expense. If expensive sets

are put in where stuffs will do, you are wasting money." Canadian engineers who have acquired the habit of timbering their shafts with hand-carved mahogany, or of using *lignum vitae* in their stopes, or of decorating their drifts with teak and rosewood, will take notice. This loose, though pleasant, practice must be pretermitted. Even the shingling of tunnel roofs must cease.

"Are your stopes and bins properly adjusted for cheap handling of tonnage? *Every fifty cents per ton you save in handling is that much gain.*" What do you think of that! Little had we imagined that the meticulous mind of modern man could pare down expenses by imponderable and petty half-dollars. And the half-dollar saved is the half-dollar gained! Precious, pertinent fact! But let us hasten to gather more manna e'en at risk of a surfeit.

"And most important your underground work, Are you following the *proper ledge*? Are your surveys right? Can your *men* figure out faults, or ore *chutes* on the vein? Do they understand what *make* deposits of ore? Can they *make* proper assay samples of the ledge, or are they accustomed to picking out *alluminizing* samples from here and there." O joy! Our vocabulary is enlarged by one good word, "alluming," a hybrid, no doubt, but *what* a hybrid! Can't you see that from the illicit union of "al-lur-ring" and "il-luming" this beauteous result is obtained? And how many of us really *do* understand what "*make* deposits of ore?"

Sad to say we can spare no more space for this lesson. Nor shall we have occasion again to refer to it. So preternaturally knowing a person as our friend cannot remain long in this climate. In his own words, the last we shall quote, he has attained "*maxim* capacity." Incidentally, there would be no further need of the *Canadian Mining Journal*, if this fount of wisdom, this ineffable oracle, the Solomon of experts, were to undam the flood of his learning.

### MINE REPORTS.

In our old school geographies the populations of cities, large and small, of provinces, of states, and of nations were recorded with appalling exactness—not *accuracy*. For instance, London's denizens were enumerated down to the last odd figure before the decimal point, quite regardless of the busy midwife and the energetic undertaker.

This passion for exactness is carried through into many spheres of life. It is manifestly present in the profession of mining engineering. One phase of this is dealt with by Mr. F. Percy Rolfe in a paper, "Illogical Precision in Mine Reports," read recently before the Institution of Mining and Metallurgy.

Mr. Rolfe remarks first upon the "prevalent custom of expressing large tonnages to the extreme accuracy of a single ton, and of reporting mine assays to ex-

cessive minuteness." He urges that these results can be expressed with equal accuracy and with greater convenience in round figures.

Development of ore bodies has but seldom checked closely with original estimates of tonnage. Ore bodies of exceptional uniformity may lend themselves to approximately exact measurement. But the ore content of irregular deposits can only be guessed at within certain limits. Broken or badly defined walls, and a score of uncontrollable factors may change the dimensions of the body at any point. In fact, the peculiarities of each vein or body are only known after the ore has been won. Thus, while it is practicable and reasonable to estimate unmined ore tonnages after preliminary facts have been determined, yet it is absurd to express estimates in finely drawn arithmetic. Small variations in width and in specific gravity introduce errors that bulk large in the final calculation. Hence round figures should invariably be used in reporting on any considerable body of ore.

Even more inept is the practice of calculating mine assays down to the ultimate cent. There is moral value, of course, in accentuating the scrupulous care that is necessary in sampling and in assaying. Hence it may be wise to insist that the assayer report the exact result obtained, not merely that result adjusted to the nearest tenth or quarter of a dollar. But over-refinement in apparatus and in method is a waste of time. Errors are inevitable in sampling and, in less degree, in assaying. When every reasonable precaution has been taken to minimize these errors, there is nothing gained by amplifying the arithmetic involved. In other words, it is foolish to carry more figures beyond the point marked by the delicacy of the methods employed. The same truth applies to the much-abused "average assay." Errors in an average may be corrective or they may be cumulative. The use of the average, therefore, is excessively dangerous unless an exact knowledge of all the circumstances is pre-supposed.

To discountenance "illogical precision" is not to encourage sloppiness. Both are vices. Both are incompatible with commonsense.

#### THE JUPITER REPORT.

As an example of judicious reserve, Mr. R. W. Brigstocke's report presented at the annual meeting of Jupiter Mines, Limited, is worthy of comment.

The Jupiter in its early days was one of the much beslobbered Porcupine prospects. Extraordinarily rich surface showings threatened it with galloping consumption. However, the property was transferred to its present owners before it had been fatally affected. The Messrs. Drummond, of Montreal, and their friends are the chief owners. Mr. Brigstocke is the consulting engineer. The policy followed has been influenced only by the requirements of the mine. No attention has been paid to the stock market. The president, Mr. T. H. Hamilton, stated this fluently. "So far as the

present market value of our shares is concerned," he said, "I may say that it is a matter that does not interest us in the slightest degree."

Mr. Brigstocke's report shows that the necessary buildings have been erected and 3,000 feet of underground work accomplished for an expenditure of less than \$100,000. His reference to spectacular showings of visible gold is worth repeating: "It is a very interesting detail. . . . that phenomenally rich ore exists in the Jupiter mine. . . . While it is somewhat dangerous to lay too much stress on the results of such samples, they must, when properly taken, be reckoned with. In arriving at the average assay values, results of samples of extraordinary richness have been excluded."

This attitude is refreshingly sane. The honest intention of sticking to essentials is apparent. Porcupine is to be felicitated upon the Jupiter report. It contains possibly too little, certainly not too much.

#### SILVER.

The gratifyingly high price of silver is one of the causes of the generally heightened activity in Cobalt, Gowganda, and Elk Lake district. As a matter of fact, Gowganda and Elk Lake would have come forward without the added inducement. It is recognized that they have not been fairly treated, and recent work has brought much encouragement. So also in the case of Cobalt mines, like the Nova Scotia and the Peterson Lake, the possibilities are too great to permit of their being long neglected. But the movement would have been slow had not silver reached and maintained its present high level.

India and China are, of course, the chief consumers of the world's production of silver. It seems highly probable that India, whose silver reserves are much depleted, will soon be forced to buy heavily. The successful adoption of a limited gold currency has not appreciably affected the demand for silver. India is prosperous and well able to absorb additional silver. Should this year's monsoon prove other than bad, the demand for silver will be sufficiently strong to hold, or even to raise, the price of silver.

The situation in China is uncertain. It is safe to predict, however, that if political unrest does not become too pronounced, and if the proposed Chinese loans are successfully raised, then another stimulating factor will immediately be brought to bear upon the silver market.

In brief, the whole situation at present seems favourable. This in itself affords a sense of security to those who are attempting to open new prospects or to revive abandoned mines in northern Ontario.

#### SIC TRANSIT.

The Royal Trust Company has issued formal notice of the forthcoming sale of the properties of the Amalgamated Asbestos Corporation. The sale is to take

place on June 10th. The only probable or expected bidder will be the newly-organized Asbestos Corporation of Canada. The capital of the latter concern is \$7,000,000, less than one-third of the Amalgamated capital.

In these columns all necessary remarks have been made about the Amalgamated. Its bequest of debt has been cleared off. The re-organization has been carried on in a manner fairly satisfactory to the majority of those most largely interested. With a strong execution upon whom the lessons of the past are strongly impressed, the Asbestos Corporation has every chance to take advantage of the improving market. Impressive outputs resulting in demoralizing over-production will no longer be necessary.

Failure, like war, brings its benefits.

### COMPENSATION.

An important decision has just been rendered by the Privy Council in the case of Kraus vs. the Crow's Nest Pass Coal Company, by which the principle is established that relatives of workmen in British Columbia residing in foreign countries shall benefit under the provincial Workmen's Compensation Act. The Privy Council thus reverses the decision of the British Columbia Court of Appeals, and mining companies in British Columbia now become liable for the payment of claims, aggregating eighty thousand dollars, which have accumulated in the meanwhile. The decision is also of interest in view of the projected legislation to regulate workmen's compensation in Ontario.

### EDITORIAL NOTES.

One result of the English coal strike was that Canada placed orders for 50,000 tons of foundry pig iron in the United States.

His Royal Highness the Duke of Connaught, Governor-General of the Dominion of Canada, has consented to become Honorary President of the International Geological Congress.

The Nova Scotia Steel & Coal Company is moving from strength to strength. Late additions to the company's equipment at Wabana make it possible to mine a large proportion of ore from submarine areas.

Newspaper reports have it that Sir Sandford Fleming is behind the large new cement company. It is to be hoped that this does not imply that Sir Sandford has dropped his case against Sir Max Aitken's merger.

Of the eight fatalities reported as occurring in Ontario mines during January, February and March of this year, five were due to carelessness on the part of the victims, one to neglect on the part of the employer, and two to unascertainable causes.

Significant are the figures of Canada's export trade for March, 1912. The total value of the domestic exports amounted to \$20,364,254. The two leading items were agriculture and mining. The former comes first with \$9,521,258; the latter second with \$5,651,990.

There is a serious strike in progress in the Waihi gold district, New Zealand. The community depends almost entirely on the mines. The local council finds itself without funds and has been unable to continue the upkeep of the hospital. Order reigns, but a long struggle is expected.

In the mines, metallurgical works, and quarries of Ontario there were eight fatalities during the quarter ending March, 1912. This compares favourably with 17 during the corresponding months of 1911. Inspector Corkill's bulletin report, issued by the Bureau of Mines, describes these accidents fully.

The Labour Gazette for May, which, by the way, is becoming every month a more and more indispensable publication, reports only one strike among Canadian mine workers during April. That one strike occurred in Cobalt. One hundred and eighty-nine men were out for two days on account of the dismissal of two men. The strikers returned to work, but the two men were not reinstated. The strike occurred at the Temiskaming mine.

A correspondent suggests that the Pari-Mutuel system could be nicely adapted to gambling in mining shares. Like the bookmaker, the broker could be eliminated. The mechanical equalizer would register in plain view only *bona fide* transactions. He who ran might read. A flat commission to the Exchange would cover all the expenses of upkeep. The suggestion may be weird, but it certainly would be an improvement on that now in vogue.

Mr. Edward Hooper, recently elected president of the Institution of Mining and Metallurgy, in his presidential address, alluded pointedly to the ethics of professional advertising. It had been suggested that the Institution should make some pronouncement upon this question. It was thought, however, that errors of taste or judgment will "recoil on those who overstep the boundaries of self-respect." Hence it has been considered wise to leave the matter to personal discretion.

Ten fatal and eleven non-fatal accidents are reported by the Labour Gazette as occurring in Canadian mines during the past month of April. Only one of the fatal accidents was caused by premature explosion. During the same month agriculture is debited with five fatal and six non-fatal; lumbering with four fatal and ten non-fatal; railway construction with eight fatal and seven non-fatal; building with five fatal and six non-

fatal; and steam railway service with twelve fatal and twenty-six non-fatal accidents.

Suit has been entered against the Crown Reserve Mining Company, Cobalt, for 231,143 of its treasury shares. The plaintiffs are John Black et al., of Montreal, who claim that 569,950 shares were originally set aside for development purposes in trust, that no further working capital is required and that the residue should be distributed pro rata amongst themselves, the original syndicate. The company claims that no right to the shares accrues to the syndicate, and that in any case there may be more money required for working capital.

Among the recommendations made by the Royal Commission of Mines of New Zealand are the following:—Government inspectors are to be required to pass an examination higher than that of mine managers; a coal miner must have two and one-half years' experience in hewing and timbering, and must be at least 21 years of age before having charge of a "place;" and certain extra duties of inspection shall devolve upon

mine foremen. Improvement in underground sanitation, and change—and bath-houses are to be provided. To prevent miners' phthisis, the compulsory use of water sprays or their equivalent is required. A relief fund is to be provided for miners who are affected and who can prove five years' residence in New Zealand.

The behavior of nitroglycerin when heated is described in a recent bulletin of the U. S. Bureau of Mines. Nitroglycerin begins to decompose at from 50 degrees to 60 degrees C. At 70 degrees C., commercial nitroglycerin evolves sufficient nitrous fumes to permit of detection by potassium-iodide-starch paper. Even at very low temperatures it is volatile. At higher temperatures, say 135 degrees C., rapid decomposition sets in and absorbed nitrous fumes impart a reddish colour to the substance; while at 145 degrees C., strong ebullition begins. Much heat is evolved, the liquid becomes hotter, ebullition increases in violence, and at about 218 degrees C., the nitroglycerin explodes. When a temperature of between 145 degrees and 210 degrees is maintained, however, the nitro may be distilled without danger.

## PERSONAL AND GENERAL

Mr. J. J. Turnbull, M.I.M.E., F.G.S., formerly manager of an important colliery in India and a member of Council of the Mining and Geological Institute of India, recently arrived in Canada, and hopes, by the courtesy of the managers, to be afforded the opportunity of inspecting some of the larger collieries of Alberta and British Columbia.

Mr. Victor M. Meek has resigned the superintendency of the Stobie mine at Sudbury, Ont. His present address is Port Stanley.

Mr. A. B. Coussmaker, of London, is on his way to British Columbia to investigate the platinum resources of that province.

It is understood that Mr. William Frecheville has been recommended for appointment to the professorship of mining at the Royal School of Mines, London.

Dr. J. Austen Bancroft, of McGill University, has been engaged by the Department of Mines of Quebec to make a survey and report on portions of the drainage basins of Harricanaw and Bell Rivers, in north-west Quebec. Dr. Bancroft and his assistant, Mr. A. O. Dufresne, leave Montreal for this region towards the end of May.

It is announced that Mr. C. Stanley Martin, for many years manager of works for Messrs. Camell, Laird & Co., in Cumberland, England, has been appointed superintendent of the Dominion Iron and Steel Company's works at Sydney, N.S., in the place of Mr. C. H. McMillan, who has resigned.

Mr. H. A. Lewis, formerly assistant manager of the Temiskaming mine, at Cobalt, is now engineer in charge of the Berenguela Tin Mines, Berenguela, Oruro, Bolivia.

Mr. A. B. Willmott is at Killarney, Ont.

Mr. T. H. Rea is in New York. Mr. Rea has taken an office in the Standard Bank Building, King Street, Toronto.

Mr. Frank Loring has returned from a professional visit to Gowganda and Porcupine.

Mr. H. Mortimer-Lamb, secretary of the Canadian Mining Institute, was in Toronto on May 25th.

Prof. J. C. Gwillim, of the Kingston School of Mining, passed through Toronto on his way to Vancouver on May 19th.

Mr. R. B. Lamb is making an extended professional trip to Swastika, Porcupine, and Gowganda.

Mr. O. N. Scott, mining engineer, has moved to larger offices in the Dominion Bond Building, corner King and Yonge streets, Toronto. Telephone number and cable address remain the same.

At the recent meeting at Ottawa of the Royal Society of Canada, Mr. D. B. Dowling and Mr. Wm. McInnes, of the staff of the Geological Survey, were admitted to membership. The honor is a fitting recognition of the scientific attainments of these gentlemen and of their eminent services to the country.

Mr. Fritz Cirkel, who visited his native land last winter for the first time since his arrival in Canada some twenty or more years ago, has just returned to Montreal. He was given a most enthusiastic reception in Germany by his former professional associates, who, he states, displayed a keen interest and a considerable acquaintance with the developments now taking place in the mining industries of this country.

Mr. Robert Musgrave, who now makes Victoria his headquarters, after having been for years mining in Mexico, recently returned from a trip into the Chilcoten country, B.C.

Mr. James Findlay, of Cranbrook, East Kootenay, B.C., long associated with the operation of the Sullivan Group mine and lead smeltery, is reported to be about to visit Great Britain.

Mr. Charles W. Goodale, of Butte, Montana, a well known metallurgist, has been attending a golf tournament held two or three weeks ago near Victoria, B.C.

Mr. W. R. Wilson, manager of the Crow's Nest Pass Coal Co.'s collieries in Southeast Kootenay, B.C., was called east lately owing to the illness of his wife.

Dr. J. Bonsall Porter, with the McGill Summer School of mining students, was in Alberta and British Columbia, after having visited Northern Ontario early in May.

Mr. W. H. Trewartha-James, formerly general manager of the Tyee Copper Co., Ltd., with offices in Victoria, B.C., is now practising as a mining engineer in London, England.

Mr. J. W. Bryant, after having spent the winter on the property in Southern Yukon of the British Yukon Gold Mines, Ltd., will shortly return to Victoria, B.C.

Mr. W. J. Watson, of Ladysmith, Vancouver Island, has been gazetted attorney in British Columbia of the Tyee Copper Co., Ltd., the head office of which is in London, England.

Mr. W. J. Elmendorf, general manager of the Portland Canal Mining Co., Ltd., has removed his home from Spokane, Washington, to Victoria, British Columbia.

Mr. Ernest Levy, manager of the mines of the Le Roi No. 2, Ltd., Rossland, and the Van-Roi Mining Co., Ltd., Slocan, has returned to British Columbia from a visit to England.

Mr. Arthur Lakes, Jr., manager of the Ymir-Wilcox Development Co., who had been for a time in the Kootenay Lake Hospital, Nelson, B.C., suffering with a broken leg, is about again.

Dr. D. D. Cairnes, of the Geological Survey of Canada, accompanied by three assistant geologists, left Vancouver for Dawson, Yukon, on May 2, going by steamer from Seattle to Skagway, and thence down Yukon River. It is expected that during the field work season of 1912 this party will complete the Survey's geological investigations along the 141st meridian—the Yukon-Alaska boundary—between Porcupine and Yukon rivers.

Mr. Melbourne Bailey and Mr. L. Muller, who remained in Cariboo district throughout the winter, have been busily engaged lately in making preparations for the 1912 season's gravel-washing operations on Mr. John Hopp's several placer-gold mines in the vicinity of Barkerville. Mr. Hopp, following his yearly custom, spent the winter on the coast, but will shortly proceed to Cariboo to take an active part in the hydraulic work, which is on the largest scale of all in Cariboo mining division.

Mr. E. G. Warren, general manager of the British Columbia Copper Co., Ltd., accompanied by Mr. Frederic Keffer, geologist and mining engineer, Mr. E. Hibbert, superintendent of mines, and other local officials of the company, returned to Greenwood on May 1st after having made an automobile trip to Voigt camp, near Princeton, Similkameen, where the company is developing several of a large group of copper claims held under option of purchase, and on which the occurrence of large ore-bodies has been reported.

## THE LAW OF THE PAY-STREAK IN PLACER DEPOSITS\*

By J. B. Tyrrell

Twelve years ago I had the pleasure of reading a paper before this Institution\*\* on "The Gold-bearing Alluvial Deposits of the Klondike District," in which the topographic features of the country were briefly outlined, and the general character of the gravels and the underlying rocks were indicated. At the same time it was pointed out that the two sources from which to obtain an adequate water supply for the efficient mining of Bonanza Creek were the Rocky Mountains to the north and the conservation of the water of the creek itself. It is interesting to record that both these projects, first laid before the public through this Institution, have now been completed by the building of a great ditch and flume from the Twelve Mile River, at the foot of the Rocky Mountains, and by the building of a dam across the upper part of Bonanza Creek.

This evening it is my intention to present to you, very briefly, some of the results of a study of the placer deposits of that northern country, especially with regard to any light that they may throw on the laws governing the deposition of placers and the formation of the run of coarse gold which is usually found in the bottoms of the larger valleys, and which is known as the "pay-streak" or "pay-lead." It is believed that the laws or principles here enunciated not only explain the occurrence and characteristics of "pay-streaks" in the Klondike district, but that they have general application to the concentration of heavy metals or minerals in alluvial deposits.

Placer deposits may be defined as "detrital deposits of heavy metals or minerals mechanically concentrated by natural agencies."

Prof. James Geikie defines a placer as "an alluvial deposit derived from the disintegration of metalliferous rocks and ore-bodies of various origin."

Richard Beek says.

"By detrital deposits we understand accumulations of ore formed by the destruction and re-deposition of primary deposits. These two results have been accomplished, in the main, in a mechanical, but in part, also, in a chemical way. In both cases water was the main agent used by nature for the purpose. Such a destruction and re-deposition of primary deposits may have taken place in remote geologic periods, but only in comparatively rare cases have the products of such periods been transmitted to us in a recognizable condition. On the other hand, the Tertiary and Pleistocene formations of the earth's surface contain a great number of such detrital deposits, as they are commonly called. It is customary to use the term placer gravels for the Pleistocene and Tertiary alluvial gravel deposits."

And again:

"Placer gravels are deposits of loose, more or less rolled, material derived from the destruction of older deposits, lying on the earth's surface, or at least very close to it, and containing paying amounts of ore or precious stones.

"As the material composing placer gravels has been exposed to all the influences of the atmospheric air and of the water seeping through the upper strata of the soil, placers will be found to contain, in the main, only relatively insoluble, and, in general, refractory metallic compounds, which, moreover, are protected

\*Paper read before the Institution of Mining and Metallurgy.

\*\*Trans., viii, 217-229.

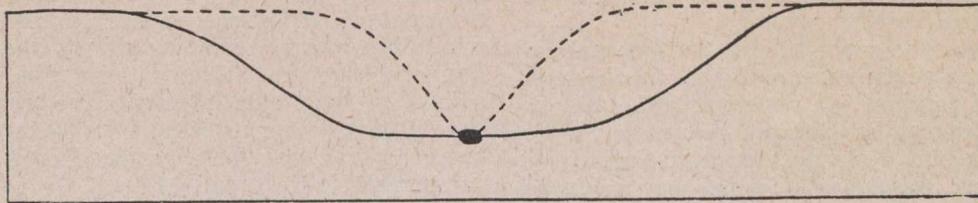


FIG. 1.—Diagrammatic representation of Pay-streak in the bottom of a simple valley.

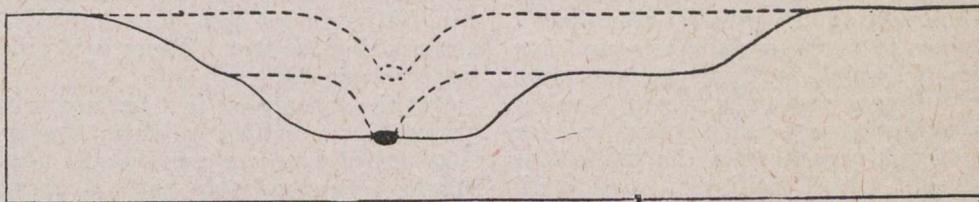


FIG. 2.—Diagrammatic representation of second Pay-streak directly below the first.

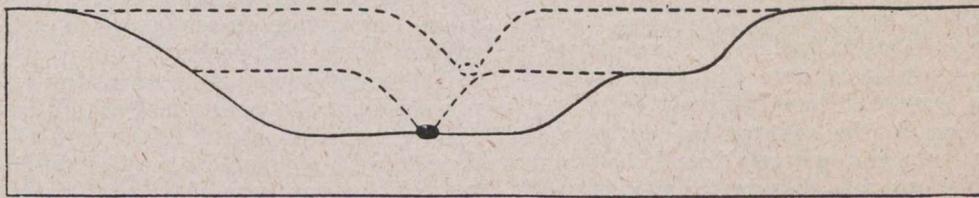


FIG. 3.—Diagrammatic representation of second Pay-streak obliquely below the first.

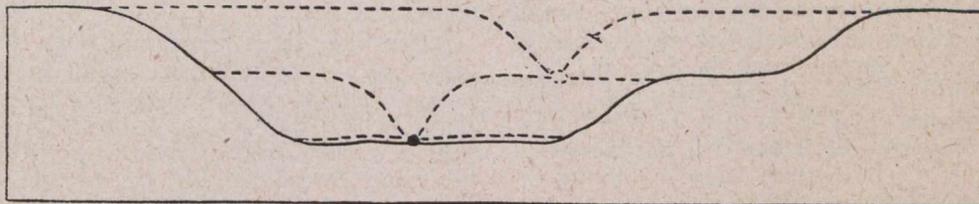


FIG. 4.—Diagram showing how first Pay-streak may be distributed in second valley.

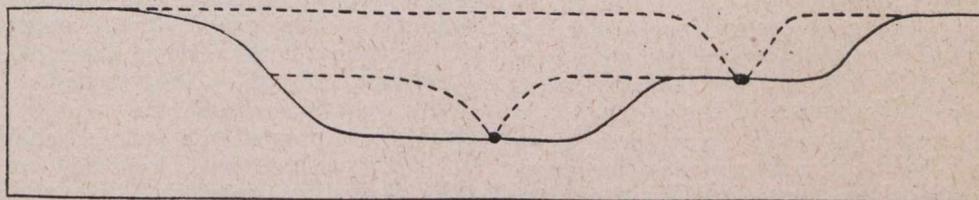


FIG. 5.—Diagram showing first Pay-streak as terrace and second lighter Pay-streak in second valley.

by their great specific gravity against easy removal by water.  
 "These placer gravels are usually grouped into two classes, according to their position with reference to the deposit from which they are derived, and in part,

also, according to the manner of the original process in which they are derived from the primary ore deposit:  
 1. Residual gravels, i.e., of local origin (eluvial gravels).

2. Alluvial gravels, i.e., formed by washing. These may again be subdivided, according to age, into recent, Pleistocene and Tertiary gravels.

"Residual gravels, the rarer of the two groups and certainly the less extensive, are found in the immediate vicinity of the original ore deposits, and quite independent of water-courses, viz., on mountain slopes, plateaus, and sometimes even on mountain summits.

"On the contrary, the gravels formed by the transporting and washing action of water are found only in the channels of brooks and rivers, in fresh-water lakes or along the sea-coast. They lie for the most part within the present valleys or along the present shore, but are also often found in stretches of fluvial sediments, sometimes intersecting the present direction of the valley on old river terraces, or in sheets covering plateaus (California, Ohlapien in Transylvania), and, finally, in old shore terraces above the present level of the sea. Their material is always much rolled, and for the most part is assorted, according to the size of the ingredients, into shingle, gravel, sand, clay, mud, etc."

Residual gravels occur on many of the higher slopes in the Klondike, but only in few cases do they form workable placers. The best illustration of such placers which came to my notice was on the upper portion of Victoria Gulch, one of the tributaries of Bonanza Creek, where some beautiful sharp "spinel twins" of gold were found, just in the condition in which they had been washed out of a vein that outcropped higher up towards the summit of the ridge.

Most of the placers in the country are such as are designated above "alluvial gravels" and belong to the class of alluvial gravels found "in the channels of brooks and rivers."

In many of these alluvial gravels that occur throughout the Klondike some gold can be found, but in the gravel deposits in the bottoms of most of the wider valleys, whenever gold is present, it is not evenly distributed, for most of the coarser particles are found in a band of restricted width which lies on or close to bedrock, and wherever the bedrock is fissured these particles descend into it for varying distances. This band or run of coarse gold is known as the "pay-streak," and the discovery of it beneath the gravel of the alluvial plain is the constant desire of the prospector.

The existence of this pay-streak has been recognized by placer miners from time immemorial.

A. G. Lock refers to it as the "gutter," which he defines as the lowest portion of a lead, which contains the most highly auriferous dirt."

Posepny states: "The gold occurs concentrated in the deepest portion of the weather-detritus, that is to say, on the contact with bedrock, and has penetrated all the open, loosely-filled fissures in the latter."

Beck states: "It would, however, be an error to assume that in a cross-section of a river valley the lowest layers of shingle, gravel or sand are throughout the richest. On the contrary, the values in this horizon are variable and pay gravel is ordinarily limited to streaks of greater or less width, which are found in one place in the centre of the valley, in another along one side, now nearer, now further away, from the present water-course."

W. Lindgren writes of the pay-streak as follows: "It is well known to all drift miners, however, that the gold is not equally distributed on the bedrock in the channels. The richest part forms a streak of irregular width referred to in the English colonies as the

'run of gold' and in the United States as the 'pay-streak' or 'pay-lead.' This does not always occupy the deepest depression in the channel and sometimes winds irregularly from one side to the other. It often happens that the values rapidly diminish at the outside of the pay-lead, but again the transition to poorer gravel may be very gradual. An exact explanation of the eccentricities of the pay-lead may be very difficult to furnish."

It is true that the pay-streak very often seems to be one of the most elusive of phenomena, and time and again the prospector is inclined to say that there has been no advance in the knowledge of the laws which govern the deposition of placer gold since the days of Job, 35 centuries ago, and that all that can be said now, as then, is that "There is a vein for silver and a place for gold."

But the pay-streak is a feature in the structure and growth of the valley in which it occurs, its formation is governed by certain geological laws, and those laws should be recognizable without great difficulty if the growth of the valley can be traced with reasonable accuracy.

In what we now know as the Klondike district, marine sediments were laid down at various periods up to the beginning of Tertiary times, and after their deposition they were raised, crushed and bent into their present form and position.

The country was then worn down to base level, and a peneplain, the remains of which can now be seen at an elevation of about 3,300 feet above the sea, was formed. This peneplain may be called the "dome peneplain," as portions of it are distinctly recognizable in the vicinity of the mountain known as "The Dome." For our purpose the period of its formation may be designated as the "first cycle of erosion," since the history of the gold-bearing gravels would appear to begin with it and no gravel deposits have yet been recognized on it.

After the dome peneplain was formed the "first period of elevation" began, and the country was raised to a considerable height above the sea. The Yukon River, which had probably been outlined at an earlier period, immediately began to erode its channel, while the water, which fell as rain on the elevated Klondike land, carved out smaller valleys to carry the drainage from it to the larger river. As the Yukon River was a powerful eroding agent it deepened its valley rapidly, and at the same time the smaller streams radiating from The Dome, such as Bonanza, Hunker, Dominion, Sulphur Creeks, etc., kept excavating their channels to keep pace with the lowering of the bottom of the valley of the Yukon River, which was the master-stream into which they flowed.

During all this time the valleys of these smaller streams maintained the general character of gulches or young valleys, with V-shaped cross-sections. But little gravel or loose material remained on the rock which formed the bottoms of their channels, for it was being constantly moved downward by the current towards the Yukon River, and, on the way, was helping to cut deeper and deeper into the rock over which it travelled.

While this process of deepening the valleys was in progress, detrital material was being constantly brought into them by wash from their sides and by smaller streams from the ridges between them, and, as the rocks from which this material was derived were gold-bearing, the detritus contained a small quan-

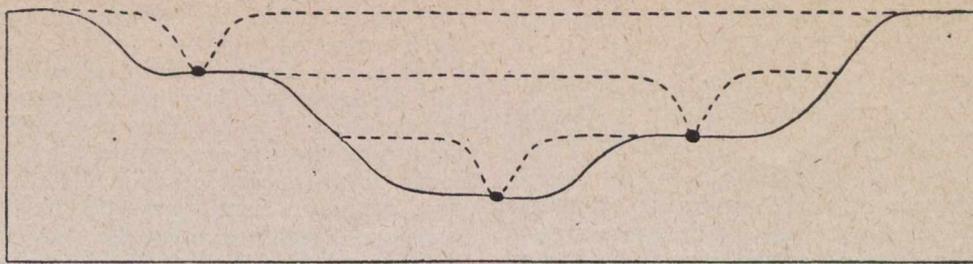


FIG. 6.—Diagram showing three Pay-streaks at different elevations.

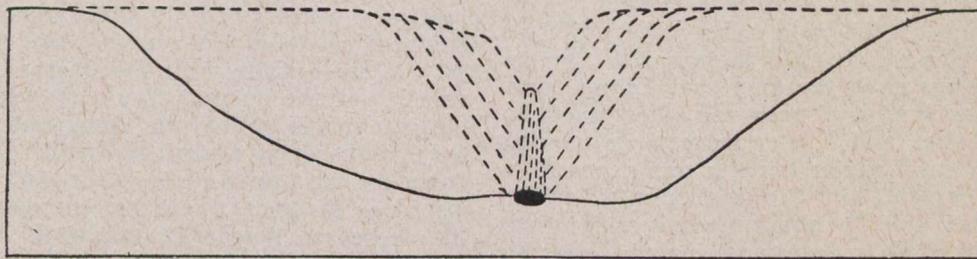


FIG. 7.—Diagram showing formation and downward growth of a Pay-streak in a wide valley.

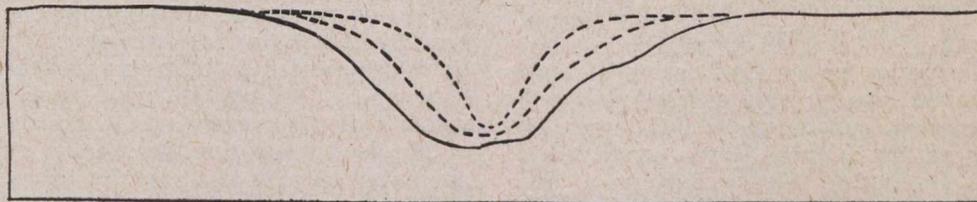


FIG. 8.—Diagram illustrating the transformation of a V-shaped valley into a U-shaped valley. (After Chamberlin and Salisbury.)

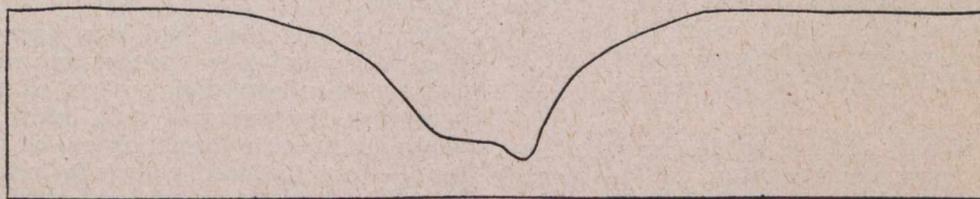


FIG. 9.—Diagram to illustrate the widening of a valley flat by erosion. (After Chamberlin and Salisbury.)

tity of gold. Thus gold and particles or masses of rock were fed gently into the main streams.  
 Now, a stream with a certain velocity is able to carry pebbles of a certain size and specific gravity. If the specific gravity is constant the diameter of the pebbles which it can carry will vary according to the square of the velocity, and if the velocity remains constant, the size of the pebbles will vary according to the specific weight of the substance composing them

weighed in water. For instance, if the velocity of a stream is doubled it is able to carry pebbles of quartz four times the diameter, or 64 times the weight, of those which it could carry before. If, on the other hand, one pebble is of quartz and the other is of gold, which is 11 times as heavy as quartz weighed in water, the volume of a pebble of quartz which can be carried by the current will be 121 times (11.2) as great as that of a pebble of gold, or, in other words, the dia-

meter of the pebble of quartz will be about five times the diameter of the pebble of gold.

Again, if particles of quartz and gold of equal size are dropped into water the gold will sink to the bottom with more than three times the velocity of the quartz.

Where the fragments of rock, consisting of quartz, schist, granite, etc., and gold, are fed into the stream, they are caught by it and carried along the bottom until they lodge in some crevice or opening, from which they cannot be dislodged except by upward currents, and these upward currents will lift any pebbles of quartz or similar rock which are less than five times the diameter of nuggets, or grains of gold occurring with them, before they will lift the gold, even if the quartz and gold are equally accessible. This makes the removal of the gold exceedingly difficult as long as the crevice remains, for the upward currents will constantly carry away the finer and lighter rock, and undermine the grains of gold and allow them to sink. When the finer and lighter material is carried away, the coarser and lighter pebbles are exposed to the force of the current, and the smaller and heavier grains of gold are able to obtain lodgment beneath and between them so as to be almost inaccessible. In fact, under normal conditions, the spaces between the lighter pebbles are large enough to hold any grains of gold which could be carried by the current flowing over them.

It is thus shown that gold will remain permanently in a fissure of the rock in the bottom of a stream as long as that fissure remains in existence, and also that it will remain between or beneath larger pebbles and boulders as long as these remain unmoved.

Now, the small streams of the first period of elevation, which developed into, or was succeeded by, the second cycle of erosion, continued to cut down their channels as long as the Yukon River continued to deepen its valley. During all this the bottoms of their valleys continued to act as sluices, which were more or less efficient agents in collecting and retaining gold according to the character of rock of which they were formed. If the rock where the gold was discharged into the stream was a fissile schist standing on edge the gold would be caught at once, while, if it was a massive granite or other similar rock, without joints or fissures, or a smooth horizontal schist, the gold would be carried down-stream over it until it would be caught by some more favourable rock. In this way there would be rich places, poor places, and blanks in the streak of gold deposited in the bottom of the valley.

As the stream would continue to deepen its valley very gradually, almost imperceptibly, by downward erosion, those places which were underlain by schists standing in a vertical or highly inclined attitude would continue to hold the gold which they had already caught, and to accumulate more, for fissures would open as fast as the surface was worn away, and the gold would sink into them as they opened. On the other hand, those places which were underlain by a harder bedrock, and which had probably also a steeper grade, would remain barren. If, again, the character of the bedrock should change from "open" to "tight," the gold which it had held might be undermined by the continual downward erosion, and so be brought again within the influence of the transporting power of the running water, by which it would be car-

ried along to find some new resting place farther down the stream.

When the Yukon River had eroded its valley down to base-level, the smaller inflowing streams were no longer obliged to continue to deepen their respective valleys to keep pace with it, but were able to cut them down to grade, and then to widen and form flood plains in them, thus changing the V-shaped valleys into U-shaped ones, floored by alluvial plains through which the rivers and brooks meandered from side to side.

A normal stream decreases in velocity and gradient as it descends its valley and reaches grade near its mouth before it has cut down the rest of its valley to grade. So, when each of these streams had cut down the lower portion of its valley to correspond with the base-level established by the Yukon River, it would begin to meander and extend the width of its floor. At the same time, with the decrease in gradient the velocity of the current would decrease, and its transporting power would be diminished. Consequently, part of the detrital material which would be brought down by the upper and swifter portion of the stream would be dropped where the current was retarded by the decreased gradient, and would lodge in the bottom of the valley and form a "flood plain" or "alluvial plain." This alluvial plain would be first formed where the V-shaped valley changed into a U-shaped one.

Most of the gold which had previously been discharged into the stream with the detritus from the adjoining hills and ridges would have already lodged in the bottom of the V-shaped valley, and would have settled down almost vertically as the bottom was lowered by the downward erosion of the stream. If any gold was carried down to the mouth of the V it would have a very strong tendency to settle just where the velocity of the current was diminished, or at the head of the flood plain, and the weaker current would have no power to pick it up again, or to release that gold which was already present beneath it on account of having been previously caught in the bottom of the V-shaped valley. Thus the pay-streak would be formed. Afterwards the gravel, sand, and alluvium of the flood plain would be deposited over and beyond it, but it would continue to mark the position of the bottom of the old V-shaped valley, no matter how wide the bottom of the mature valley might afterwards be extended.

After a flood plain had been formed at the mouth of a valley the river farther up stream would still continue the downward erosion of its channel until it reached the grade of that below it, when lateral plantation and the formation of the flood plain would begin. Thus the flood plain was formed gradually up the valley from its mouth, and always, where the old V-shaped valley changed into a U-shaped valley, there was left a trail of gold beneath it.

The gold which was collected and stored in the bottom of the V-shaped valley had been derived from the rocks of the adjoining country. At the same time the lighter material derived from the disintegration of these rocks had been carried through the valley and out beyond its limits, for the stream was then cutting down and enlarging it, and not filling it up, and there was very little room beside the stream for the accommodation of loose rock material. At the head of the flood plain this gold, which had been concentrated from the rocks of the surrounding country through

previous ages, was gradually covered, and hemmed in on both sides, by gravel and alluvial material brought down by the stream at a later date. Therefore the gold in the pay-streak was derived from its home in rocks at a date which preceded that of the formation and deposition of the gravel which overlies and surrounds it.

The gravel of the flood plain may itself contain some gold which had been washed down the stream with it, or which had been washed into the valley from the sides, but this gold is usually very fine, such as might be carried readily by the stream for long distances.

If, after the flood plain was once formed, the stream should continue to deposit gravel to considerable thickness in the bottom of the valley through which it meanders, the source of supply for the gold would, on account of the general wearing down of the country, become more and more remote, and the average gold contents of the gravel would gradually decrease from below upwards.

The laws governing the formation and position of the pay-streak in an alluvial plain in the bottom of a valley may therefore be stated as follows:—

1. It was formed in the bottom and at the mouth of the V-shaped valley, which was the young representative of the present valley.
2. It marks the position formerly occupied by the bottom of that V-shaped valley.
3. The gold contained in it was washed out of the surrounding country and collected into approximately its present position before the gravel of the flood plain (or terrace) was deposited over and around it.

It has been assumed, for purposes of illustration, that the growth of the valleys in the Klondike district, which empty into the Yukon River, was continuous and regular throughout the second cycle of erosion, and in view of their symmetrical character, and the regularity of the pay-streak, which has been shown to have existed in them, it is probable that this assumption is not very far from correct; but nevertheless there were doubtless interruptions and cessations, both in the regular course of erosion and sedimentation.

After the Yukon River had cut its valley down to base level in this White Channel period, or second cycle of erosion, the tributary streams flowing from the Klondike district also widened their valleys and formed flood plains, as has just been described.

Then there was a long period of quiescence, during which the base-level of the country was raised, permitting heavy accumulation of gravel in the valleys, while at the same time the hills and ridges were worn down to mature forms. At the mouth of the valley of Bonanza Creek the local gravels, derived from the watershed of the creek itself, accumulated to a thickness of more than 200 feet. These gravels can still be recognized forming terraces at many places on the hills several hundred feet above the bottom of the valley, and Mr. McConnell, who has carefully measured them, has shown on a map accompanying his report a pay-streak running in a very straight line through and beneath them. According to the laws here formulated, this pay-streak was formed in the bottom of the old V-shaped valley, which represented the valley of Bonanza Creek at the White Channel period in its youthful stages, and it now tells us the original position of the bottom of that V-shaped valley.

Just before, or at the termination of, the second cycle of erosion, the Klondike River brought a heavy

load of sediment down from the mountains to the east, and covered the bottom of its own valley, and the mouths of its tributary valleys, with a bed of gravel, which, opposite the mouth of Bonanza Creek, has a thickness of 150 feet. The influx of this gravel caused the lower portion of the latter stream to move westward, almost to the limit of its own flood plain, and to be ready to begin a new rock valley with the advent of the next erosion cycle.

After the deposition of this upper gravel in the valley of the Klondike River a period of elevation set in and the third cycle of erosion was inaugurated, which has continued down to the present time.

With the advent of this cycle of erosion the Yukon River was rejuvenated and again began to actively deepen its channel, and at the same time the tributary streams also began to deepen their old channels, or to cut out new ones, in order to keep pace with the master-stream. The Klondike River, the largest affluent of the Yukon in this district, probably did not lag very far behind it in the work of downward erosion, but its tributaries, such as Bonanza and Hunker Creeks, undoubtedly continued to flow in narrow, V-shaped valleys as long as the main stream was actively engaged in deepening its channel.

Opposite the mouth of Indian River the Yukon River has not deepened its channel as far below the level of the channel of the second cycle of erosion as it has at the mouth of the Klondike River, and the Indian River itself, being a smaller stream, has not cut back its valley as fast as the Klondike River, so that Dominion, Gold Run, Sulphur, and the other tributaries of Indian River, have not had the same opportunity to deepen their channels as the tributaries of the Klondike River.

During the third cycle of erosion the smaller streams, and especially those flowing into the Klondike River, have cut down their channels to grade in narrow valleys, and have widened the bottom of those valleys by lateral planation and the formation of flood plains, giving them a U-shaped profile. Terraces have been formed on the sides of the valleys, indicating halts in the progress of downward erosion, and narrow V-shaped gulches still carry small, or intermittent, streams into the sides of the main valleys.

Pay-streaks, which have now been almost entirely mined out, ran beneath the flood plains down the bottoms of these valleys, or crossed the terraces on their sides, and other pay-streaks were in process of formation in the gulches until that process was arrested by the work of the miner.

It is not necessary for our present purpose to follow the growth of these younger valleys in detail, or to trace the formation of the pay-streak in them, for that was clearly governed by the laws which we have already enunciated, but it will be interesting to indicate a few of the eccentricities which may have been introduced in the pay-streak by irregularities in the growth of the valleys in which they were formed.

We have already seen that difference in the character of the bed-rock will produce a marked difference in the quantity of the gold in the pay-streak.

A variation in the supply will also influence the richness of the deposit, as may be clearly seen in many of the small lateral streams which flow into the main creeks. Some of these cut across the old pay-streak of the second cycle erosion, and where this occurs the

gravels in the bottoms of these streams is enormously enriched.

Temporary cessation of downward erosion, with the corresponding formation of flood plains at successive levels, would appear, however, to exert the most powerful influence in affecting the nature of the pay-streak and introducing irregularities into it.

Let us suppose that a valley has been eroded down to the first level, and that a flood plain has been formed at that level. The pay-streak will occupy its normal position in this flood plain on the line of the bottom of the old V-shaped valley, as shown in Fig. 1.

If the stream is rejuvenated and again begins to deepen its valley a number of other conditions may occur.

1st. It may cut down its channel directly beneath Pay-streak No. 1, in which case the pay-streak will simply be lowered, and will contain practically all the gold from the older pay-streak, as well as any gold that may have been collected into the channel since the time of its formation, as shown on Fig. 2.

2nd. It may cut down its channel to one side of Pay-streak No. 1, and while still actively engaged in downward erosion may undercut the pay-streak, and allow the gold to slide down the side of the valley into the stream, where it will be carried downwards until it finds a new resting-place. In this case, too, the second pay-streak will contain most of the gold that was in the first, but it will have undergone a decided movement down the stream. See Fig. 3.

3rd. The stream may cut out its second V-shaped valley entirely to one side of the first pay-streak, but when it again begins the process of lateral planation, and forms its second flood plain, it may undercut the pay-streak and allow it to fall into the meandering stream, where part of it may quickly sink and form a pocket off the line of the true second pay-streak altogether (though it will give an indication of the former position of the first pay-streak) while part of it may be carried down by the stream and distributed in its winding channel. The true second pay-streak itself will, in this case, probably be very weak. See Fig. 4.

4th. The second channel may be formed altogether to one side of the first pay-streak, in which case the first pay-streak will be on a terrace and the second pay-streak will probably be weak. See Fig. 5.

Any of these conditions may occur in different parts of the same valley, and their relative intensity, or rapid changes from one to another, may cause great variations in the character of the pay-streak.

A greater number of stages in the deepening of a valley would allow for a still greater complexity in the character of the one or more pay-streaks which might be found in it, and these might be still further added to by a filling of the valley with detritus and partial re-excavation at one or more different times. But, for the period in which it was formed, the pay-streak represents the bottom of the young V-shaped valley, which formerly occupied part of the present valley.

### PERSONAL AND GENERAL

Mr. T. Gibson, general counsel to the Lake Superior Corporation, and Mr. R. W. Brigstocke have succeeded Messrs. Masten and Wood as directors of the Jupiter Mines, Limited.

Mr. J. B. Tyrrell has arranged with Mr. S. N. Graham to attend to his professional business during the former's absence this summer.

Mr. Jas. G. Ross, consulting mining engineer of the Milton Hersey Co., Limited, Montreal, has returned from a professional trip to the Porcupine country.

Mr. J. H. Plummer, president of the Dominion Steel Corporation, has returned from Europe.

Dr. Frank D. Adams, president of the International Geological Congress, is visiting Halifax on business for the Congress. While there he will also attend the ceremonies in connection with the opening of the new wing of the Technical College.

Mr. Norman Fisher, manager of the Temiskaming Mine, Cobalt, and Mr. G. R. Mickle, Provincial Mine Assessor of Ontario, were in Montreal last week as witnesses in the case of Black et al. vs. the Crown Reserve Mining Company.

## BEAR RIVER COAL FIELD, B.C.

By C. F. J. Galloway, B.Sc.\*

Concluded from May 15th issue

The Grand Trunk Pacific is building a length of 150 miles in each direction from Fort George this season, and will have steamers running down the Fraser from railhead to Tete Jaune Cache to Fort George as soon as navigation opens, so that it will be a very short time before this coalfield will be put in communication with the outside.

The market for the Bear River coal will be entirely in the central portion of the Province, a vast area in which it is the only workable coal (except lignite) yet known.

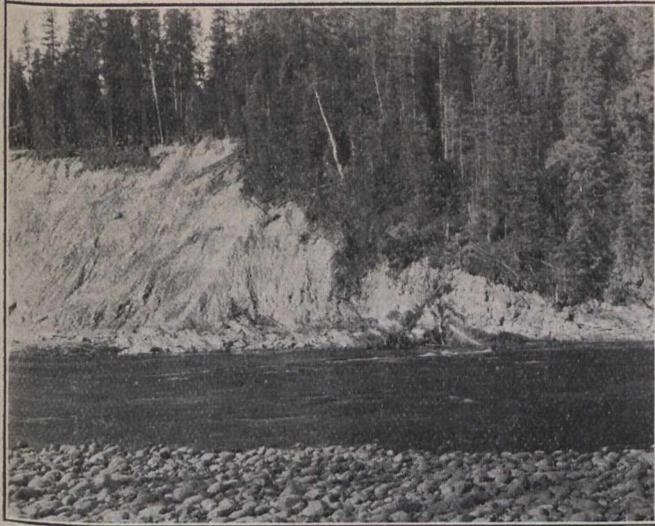
Within the next three or four years this country will be traversed by a number of railways, which will open up an enormous amount of fine agricultural land, and what is now practically an uninhabited country will support a large population, for which Fort George will be the natural metropolis.

\*Written for the Canadian Mining Journal.

The main line of the Grand Trunk Pacific Railway, now under construction, will probably be completed next year, running from Prince Rupert to Hazelton, and thence through the fertile Bulkley and Nechaco valleys to Fort George, and from these up the Upper Fraser valley to Tete Jaune Cache, and through the Yellowhead Pass into Alberta.

The Pacific and Great Eastern Railway, from Vancouver, up Howe Sound, across to Lillooet, and thence up the Fraser valley to Fort George, is to be completed by July, 1915, according to the announcement recently made by Premier McBride. This will open up a great stretch of fertile country, and put the central interior in direct communication with Vancouver.

The main line of the Canadian Northern Pacific passes to the south of the central portion of the Province, but that company has recently acquired a charter



Workable Seams have been found in these banks



Steamer "B X" in Fraser River



Part of Bear River Coalfields



Bear River—Willow Creek Pass in distance



South Fort George from across Fraser River

to build a line to the coast at Bute Inlet. This line may pass straight across from Tete Jaune Cache to the coast, as indicated on the accompanying map, or else parallel the Grand Trunk Pacific to Fort George, and thence to the head of Bute Inlet. This latter alternative would seem probable from the fact that it is announced that this railway has applied for yardage space in Fort George.

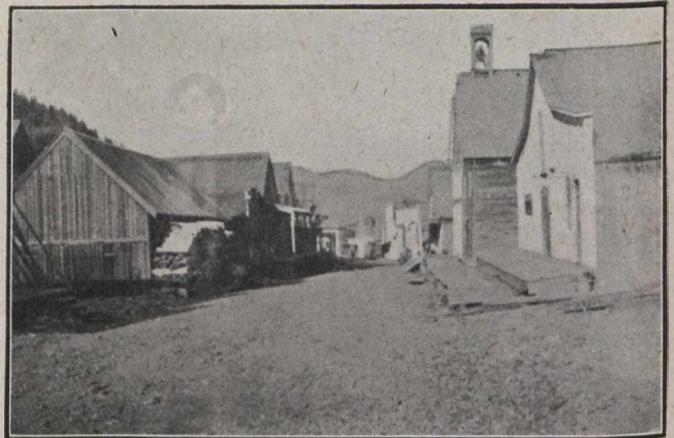
The Alberta Central Railway, a line identified with the Canadian Pacific, coming from the main line of the latter, via Red Deer, Alta., to the Yellowhead Pass, is expected to make for Fort George, having also applied for yardage space there, as has likewise the Edmonton, Dunvegan and British Columbia Railway. This line, said to be a Grand Trunk undertaking, is already built for some distance north from Edmonton. It will pass through the Peace River country of Alberta and British Columbia, thence coming south to Fort George.

A charter has been granted for a line from Fort George to Fort Macleod and thence to the Peace River country, with a branch from Fort Macleod via Fort Fraser to Bella Coola. Engineers are now in the field, and work is expected to begin very shortly. This line

and thence to the Yukon district. This railway may possibly use the line of the Pacific and Great Eastern between Lillooet and Fort George as shown on the map.

The Cariboo, Barkerville and Willow River Railway has already been mentioned.

These lines, some actually under construction, some to be completed by July, 1915, and others only projected so far, but all backed by sound financial organizations, will rapidly open up this country, and afford facilities for an immense amount of immigration.



Barkerville

Wood fuel is scarce in many places throughout this area; in Fort George it costs \$12 per cord, so that there will be a large market for coal for domestic use, as well as for railway consumption.

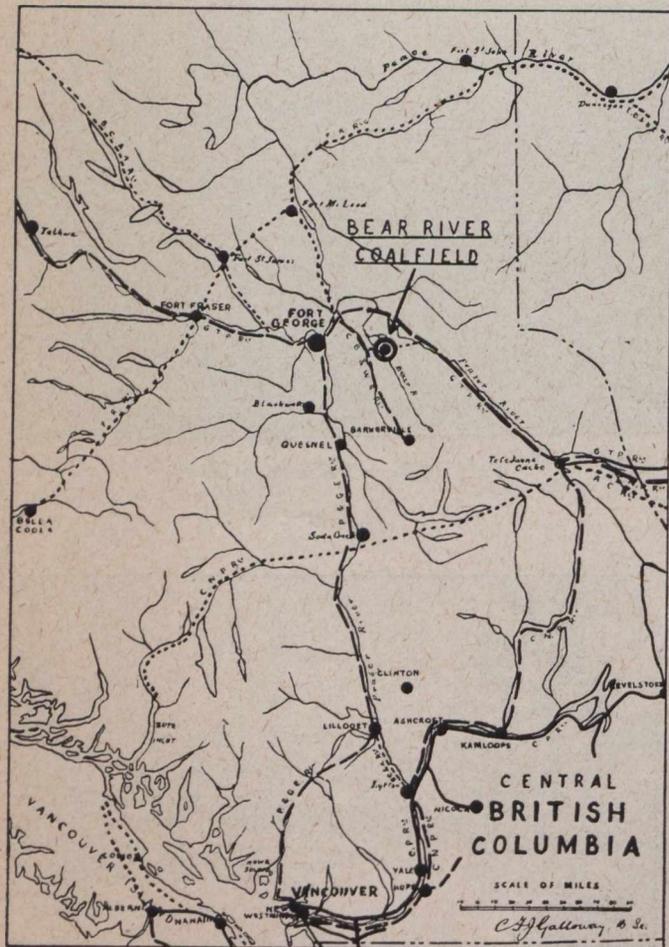
It is only a matter of time before industries are established. The mineral wealth of the country, which is reported by reliable engineers to be great, will necessitate the installation of smelters, and the coking quality of the Bear River coal will render it most valuable in this connection, if, as is probable, it gives a satisfactory coke in practice.

In this regard it may be remarked that, although the proportion of volatile matter to fixed carbon is so high that in a carboniferous coal it would at once be classed as not suitable for coking, the rules which apply to the older coals are not applicable to the more recent coals of the West, in which the volatile matter is of somewhat different constitution.

The coal of the Nicola coalfield, which has a somewhat similar analysis to this, yielded an excellent coke in a ten-ton test in Simplex by-product ovens in England.

The Bear River field is uniquely situated; while it is so far from the coast on the one side, and the prairies on the other, that it cannot compete with other coals in their markets, it has entirely to itself the market of this area, as large as Scotland, which is destined to become one of the most important parts of the country.

The nearest coal on the west which appears to be workable is the Copper River field, 350 miles away; on the east at Jasper Park, in Alberta, 200 miles distant; on the south, Nicola, over 400 miles; and on the north there is only the undeveloped Peace River field, 150 miles distant, the natural market for which will be on the prairies.



will serve to give an outlet to the grain from the Peace River, and also to put it in direct communication with Vancouver.

The British Columbia and Alaska Railway has a charter for a line up the Fraser valley from Lytton, on the main line of the Canadian Pacific, to Fort George,

## TECHNICAL WRITING—SOME SUGGESTIONS TO STUDENTS.

(Written for The Canadian Mining Journal.)

Science is well taught in Canadian universities. This is recognized far afield, for men come from Oxford and Cambridge to take the mining course at McGill, or at Queen's or at Toronto. But there is unquestionably a defect in our educational system somewhere. Whether the fault lies with the common schools or elsewhere, the fact remains that not one science undergraduate in a hundred is capable of correct literary expression. By this is not meant the niceties of "style" or fine writing; but merely the right application of grammatical rules, and the discriminating choice of words whereby the significance of the idea to be expressed is not obscured. Until the Science Faculties of the universities recognize that facility in this respect is not a "frill," but an essential, they will continue to turn out graduates imperfectly equipped to undertake one of the more important of the duties required of the engineer in active practice.

In this connection we have been granted permission to take extracts from a letter recently addressed by a well-known metallurgist to a young writer, on whose thesis, describing a smelting works, the former had been invited to pass judgment.

This letter, though reflecting the kindly nature and tolerant spirit of its author, is, nevertheless, severe enough in its comment on the loose phraseology, the inappropriate language and the ill-constructed sentences of which he finds numerous instances in the thesis in question. His criticism, however, is invariably constructive in character, and has a general application. To quote:

"The object in writing a scientific paper is to convey some definite information to some one who wants that information. Hence the information must be exact, must be new, and must be clearly conveyed."

"You have been at ———; have used your eyes and ears to good advantage, and have yourself acquired information useful to you. Your idea in writing a paper should be to pick out some part of that information which you think would be useful to others and tell about it in a clear and convincing way.

"The plant at ——— has been described many times before. You are not writing for newspapers or general readers. You are writing for metallurgists, who have already much information on the subject and who want more exact information about details. Yet you say you have purposely avoided details. The moral is, do not write unless you have definite and useful information to convey.

"The next matter to which I wish to call your attention is the use of concise, clear English. Very few scientific teachers take the trouble to impress on a boy the necessity of clear thinking and clean expression of his thoughts. Language is your only means of conveying information. You cannot pay too much attention to it. Here are a few notes on certain expressions in your paper:

"'Roughly' is a poor substitute for 'approximately.'

"You refer to 'a conveyer which travels over the cars and the ore is thus distributed throughout the length of about 14 cars.' This is a rather clumsy way of saying, 'travels over a train of 14 cars and distributes the ore evenly throughout this train.' You see you have changed subjects in this sentence. 'Conveyer' is your first subject; 'ore' is your second subject. Don't

swap horses while crossing a stream. Keep the conveyer as the subject till you get done with it.

"It's a bad plan to talk about 'drawing' a sample. Don't use a local term in a paper that goes all over the world. A sample is 'taken' everywhere. Even if in ——— they use another term.

"You remark: 'Wet and dry weights are both sent.' They are not unless you use a wheelbarrow. You mean they are 'reported' to the office.

"Again 'lay out' is another local term. That is universal. Use 'plan.'

"You attempt to tell about blast furnaces and bessemeres. What do your readers want to know? A smelter man wants to know this: What kind of charging cars? How many in a train? Is ore in separate cars from coke and flux, or are all mixed in the cars? What method of charge train haulage is used? How are charges weighed? (Here you miss describing the very peculiar spring scales in use at these works). What size furnace? How high tuyeres to charge door? How high is charge kept? Is it run with a cold top or not? How much blast and at what pressure? How many jackets? (You miss describing the peculiar double tuyere on one blast pipe.) Is hearth bricked or not? What kind of spout? What is plan of settler? How is it lined? What kind of top jacket on settler? and so on.

"In talking about a stack always give top and bottom interior diameter.

"Converter slag, not converter 'skimmings.' Use general not local terms.

"'Hissing much' sounds like a child talking about boiling oatmeal. You mean 'semi-molten mass.'

"Slag is cast in blocks; metal in ingots.

"Would it not be much better instead of confusing your readers by 'north and south' to say something like this: 'The main furnace building is (so) long and (so) wide. The furnaces are ranged end to end along one wall. The converters and casting machines along the opposite wall.' In this way you convey a clear and definite impression.

"Now about converters. How many? What size and shape? Are they bricked back of acid lining? What size mould is used? What shape? How many tuyeres? What kind of tuyere valve? How are shells lined—by hand or by tamping machine? How are they dried? How much lining is used per shell—per ton free matte and per ton copper, and so on?

"Don't talk about bullion. Bullion is any metal carrying gold or silver. Lead forms bullion. So talk about 'copper.' Then people everywhere will understand you.

"You speak of 'yellow brick.' Nobody cares if it was sky blue or rose pink. What kind of brick? Fire brick, clay brick or curdotis radial brick?

"Again you talk of 'engines a little bigger and a trifle smaller.' Be exact. It's information you are trying to convey.

"In conclusion, let me tell you a story: Some promoters financed an exploring party in the Rocky Mountains. The boys found gold. The promoters sent an expert who reported learnedly about geology and glowingly about the prospects. They were not satisfied and sent another who did the same. Finally, they sent Mickey O'Farrell, an old mill man. Mickey looked over the property and wrote:

"Dear Sur,—

"The boys hav goold alright.—Some goold, but ye'll need a pack trane av bald hedded eagles to get

yere supplies in and yer goold out, so if I was ye I wuddn't touch it. Yours trooly servant,

“ ‘Mick O’Farel.’ ”

“Now Mickey made a report, a good report. The experts missed the point.”

### EXPERIMENTAL MINE OF THE BUREAU OF MINES.

The explosibility of a mixture of coal dust and air under test conditions having been repeatedly demonstrated at the experiment station of the bureau at Pittsburgh, Pa., the Bureau of Mines is now endeavouring to determine the exact conditions under which such explosions take place in mining operations. After having failed in many efforts to find a small coal mine available for its use, the bureau obtained a tract of coal land near Bruceton, Pa., about ten miles south of

Pittsburgh, and has opened there a small experimental mine for the study of coal-dust explosions. The plan of work does not contemplate the opening up of an ordinary coal mine, but rather the driving of a double entry, or tunnel, into the coal bed for about 2,000 feet and then opening, from the entries, a few rooms in which experiments may be conducted to determine, under the conditions of actual mining, the behaviour of different types of explosives, the conditions that determine the ignition of gas or dust, or mixtures of gas or dust and air, and the factors involved in the spread of the resulting explosions. The main purpose of the investigations carried on at the mine is, of course, to discover the most efficient methods of preventing such explosions. If the necessary funds can be obtained for carrying out this plan to the extent necessary for reliable results, the United States will have made an important contribution to the understanding and prevention of coal-dust explosions.

## INTERNATIONAL GEOLOGICAL CONGRESS TWELTH SESSION, CANADA, 1913

### PROGRAMME.

It is proposed to hold the meeting of the Congress in Toronto, beginning on or about the twenty-first day of August. The Congress will continue in session for eight days.

#### Topics for Discussion.

The following topics have been selected by the Executive Committee as the principal subjects for discussion:—

1. The coal resources of the world.
2. Differentiation in igneous magmas.
3. The influence of depth on the character of metaliferous deposits.
4. The origin and extent of the pre-Cambrian sedimentaries.
5. The sub-divisions, correlation and terminology of the pre-Cambrian.
6. To what extent was the Ice Age broken by interglacial periods?
7. The physical and faunal characteristics of the Palaeozoic seas with reference to the value of the recurrence of seas in establishing geologic systems.

#### The Coal Resources of the World.

The Executive Committee of the Eleventh Congress, held in Sweden, compiled and published a comprehensive report on the Iron Ore Resources of the World. The present Executive has undertaken the preparation of a similar monograph on the Coal Resources of the World. In order to make the work as complete as possible the co-operation of all the principal countries of the world has been invited. This invitation has met with a cordial response, and it is hoped the volumes will be ready for distribution before the meeting so that they may constitute a basis for discussion at the Congress.

#### Excursions.

Arrangements have been made for a series of excursions which will enable the members of the Congress to gain a knowledge of the geology and physiography as well as the mineral and other natural resources of all the more accessible portions of the Dominion of

Canada. These excursions will take place before, during and after the meeting of Congress. Members will be given the opportunity of participating in one or more of the longer in addition to several of the shorter excursions.

#### A.—Excursions Before the Meeting.

A.1—“Maritime Provinces” (Nova Scotia and New Brunswick) Time 10 days

This excursions provides for a visit to the maritime provinces of the Atlantic Coast. Some of the chief points of geological interest in this part of Canada are: the Cambrian section at St. John; the gorge at the Grand Falls on the River St. John, both in the province of New Brunswick; the well known Joggins section of the Carboniferous of Nova Scotia; the gypsum deposits and the oil shales of the Bay of Fundy; and the Carboniferous section in Cape Breton. The coal mines and steel works at Sydney and North Sydney will also be seen. A visit will be made to one of the gold mines in Nova Scotia where the characteristic dome structure is typically developed. On the return journey the Devonian fish beds of Chaleur Bay, Quebec, will be examined. In addition one of the finest Appalachian sections in North America will be seen in the high cliffs of Gaspe.

A.2—Haliburton-Bancroft, Ontario. Time 9 days

This area lies on the margin of the Laurentian Pro-taxis of the North America Continent, to the North of Lake Ontario. In this district is exposed the most notable section of the Grenville Series in Canada. The strata show to a remarkable degree the results of progressive metamorphism, as a consequence of the intrusion of extensive batholiths of granite producing various types of amphibolite, etc. This district is also interesting by reason of the very extensive development of nepheline and other alkaline syenites, some of which are of the rarer types. In certain localities these rock contain an abundance of corundum, while elsewhere sodalite, of a fine depth of colour, is conspicuous. This excursion will also include an inspection of the corundum mines and mills at Craigmont.

A.3—Sudbury-Cobalt-Porcupine, Ontario. Time 12 days  
These mining areas are situated in the Laurentian Protaxis, northeast of Lake Huron. The Huronian and Keewatin systems are here very typically developed. The chief points of interest are the nickel and copper deposits of Sudbury; the iron mines of Moose Mountain; the silver mines of Cobalt; and the gold-quartz veins of Porcupine.

A.4—Niagara-Iroquois Beach, Ontario. Time 3 days  
This excursion provides for a visit to the region south and west of Toronto near the shores of Lake Ontario. The Falls of Niagara and the gorge of Niagara River will be seen. The Silurian sections at Hamilton, and the ancient beach of Lake Iroquois, at Burlington Heights, will also be inspected.

A.5—Asbestos Deposits of the Province of Quebec. Time 3 days  
The major portion of the world's supply of asbestos comes from the vicinity of Thetford and Black Lake in the Eastern Townships of Quebec. The quarries and mills of this area will be visited and those participating will be enabled to make a brief examination of the characteristic peridotites and resulting serpentines in which the asbestos is developed.

A.6—Anorthosite of Morin, Quebec. Time 1 day  
The object of this excursion is to examine one of the typical anorthosite intrusions of the Laurentian Protaxis. These exposures lie to the north of Montreal in the neighbourhood of St. Jerome.

A.7—The Monteregian Hills, Quebec. Time 2 days  
These constitute a remarkably interesting petrographical province of alkaline rocks in the immediate neighbourhood of Montreal. The nepheline syenite and essexite intrusions, which together with the accompanying dykes and sills of tinguaitite, camptonite, etc., form Mount Royal, will be seen the first day. On the second day an excursion will be made to Mount Johnson, an intrusive plug, where a gradual transition from pulaskite to a basic essexite is excellently shown.

A.8—Mineral Deposits of the Ottawa District. Time 3 days  
This excursion will traverse the district to the north of the River Ottawa, between the cities of Montreal and Ottawa, and visits will be made to the principal deposits of mica, graphite and apatite in this area. The Grenville limestone at Lachute, as well as the original Eozoon locality, will be examined.

A.9—Mineral Deposits near Kingston, Ontario. Time 3 days  
The region in the vicinity of Kingston, Ontario, is noteworthy for its deposits of mica, apatite, feldspar, talc, graphite, corundum, pyrite and ores of lead, zinc and iron. It is also famous for the great variety of its mineral species.

A.10—Pleistocene—Montreal and Ottawa. Time 3 days  
This excursion will comprise a visit to the terraces on Mount Royal and the drift deposits at Mile End and elsewhere in the vicinity of Ottawa. It will further include, in the neighbourhood of Ottawa, the fossiliferous clays at Green Creek and the terraces on the north side of the Ottawa River.

A.11—Ordovician—Montreal and Ottawa. Time 3 days  
The time will be occupied in an examination of Ordovician formations exposed at various points between the cities of Montreal and Ottawa.

A.12—Southwestern Ontario. Time 3 days  
This excursion, which is of especial interest to palaeontologists, provides for the study and collection of Silurian and Devonian fossils. The region embraced lies to the west of Toronto between Lakes Huron and Ontario.

### B.—Excursions During the Meeting.

The arrangements provide for short excursions to various localities in the immediate neighbourhood of Toronto. Among others the following places and objects of interest will be visited.

#### Niagara Falls.

Glacial and Interglacial deposits in the neighbourhood of the Don Valley and at Scarboro Heights.

The Palaeozoic formations at Hamilton.

The sandstone quarries of the Credit River.

The morainic deposits north of Toronto.

The Laurentian of the Muskoka region.

The natural gas and oil fields of Ontario.

The highly fossiliferous Palaeozoic strata at Streetsville.

The clay deposits and works near Toronto.

### C.—Excursions After the Meeting.

Starting from Toronto there will be four transcontinental excursions as follows:

#### C.1—Canadian Pacific Railway Main Line).

Time 16 days, Toronto to Vancouver, and 5 days returning Vancouver to Toronto to Montreal.

On this excursion the party will travel over the main line of the Canadian Pacific Railway, across the Great Plains and through the Cordilleran Mountain Ranges to the Pacific Ocean.

The participants in this excursion will see the nickel and copper deposits of Sudbury; the Animikie and Keeweenawan formations near Port Arthur; the Laurentian and Keewatin rocks of the Lake of the Woods; the Cretaceous and Tertiary systems of the Great Plains, with the gas wells at Medicine Hat, and the coal mines at Banff, Alberta. Arrangements will also be made for visits to Lake Louise and the Victoria Glacier at Laggan in the Rocky Mountains; the Yoho Valley; Mount Stephen at Field and the great neve at Glacier, British Columbia. The mountains of the Selkirk Range, the Coast Range batholith, and the canon of the Fraser River are the attractive features of the final stage of the journey to Vancouver.

#### C.2—Canadian Pacific Railway (Crowsnest Branch).

Time 15 days, Toronto to Vancouver; and 5 days returning Vancouver to Toronto or Montreal.

Those participating in this excursion will travel over the main line of the Canadian Pacific Railway directly to Medicine Hat in the Province of Alberta. From this point the journey is by way of the Crowsnest branch line passing through the mining centres of Lethbridge, Fernie, Nelson, Rossland and Greenwood to Midway. At Midway the party will be divided, some returning to Nelson and Revelstoke on the main line by way of Arrow Lakes. The remainder of the party will proceed to Vancouver, passing through a mining region of which the principal places are Hedley, Princeton, Tulameen and Nicola. Between Lethbridge and Fernie sections of the Cretaceous coal measures will be examined. At Frank the party will be given an opportunity of viewing a notable rock slide which occurred in 1903. West of the Kootenay River sections of the pre-Cambrian rocks of the Purcell Range will be examined, also the intrusive contact of the granodiorite

at Nelson. The arrangements, moreover, include visits to the gold-copper deposits of Rossland; the gold-quartz veins of Sheep Creek; the copper mines of Phoenix and Greenwood; the silver-lead veins of the Sloean region; and the Nickel Plate gold mine at Hedley. In addition, the Oligocene coal basins at Princeton and Nicola, as well as the diamond-bearing peridotite at Tulameen, will be visited.

### C.3—Canadian Northern Railway.

Time 16 days, Toronto to Vancouver; and 5 days returning Vancouver to Toronto or Montreal.

It is arranged that this excursion will cross Lakes Huron and Superior to Port Arthur. Thence the party will proceed by the Canadian Northern Railway across the northern part of the Great Plains to the foothills of the Rocky Mountains. Between Port Arthur and Winnipeg an examination will be made of the Atikokan iron range. A visit will be paid to Sheeprock Lake, where fossils have recently been discovered in rocks of pre-Cambrian age. At Rainy Lake the relations of the Couchiching and Keewatin may be well observed, also examples of post-glacial faulting. In the Province of Manitoba the fossiliferous Ordovician and Devonian limestones will be seen at a number of localities, while at Pine River outcrops of Cretaceous marls and limestones will be visited. The Red Deer River, in Alberta, a locality rich in dinosaurian remains, will also be examined. From Calgary to Vancouver the party will travel over the main line of the Canadian Pacific Railway.

### C.4—Grand Trunk Pacific Railway.

Time 15 days, Toronto to Vancouver; 5 days returning Vancouver to Toronto or Montreal.

Proceeding by way of the Grand Trunk and the Temiskaming and Northern Ontario Railways, through the mining camps of Cobalt and Porcupine, the party will arrive at Cochrane and will thence travel over the new transcontinental line of the Grand Trunk Pacific Railway. This line of railway passes north of Lakes Abitibi and Nipigon and south of Lac Seul to Winnipeg, and continues west past Saskatoon and Edmonton and through the Yellow Head Pass of the Rocky Mountains.

Since the construction of the railway to the Pacific Coast will not be completed, the party will return to Edmonton and will thence journey by way of Calgary to Vancouver.

Between Cochrane and Winnipeg outcrops of pre-Cambrian rocks, as well as Glacial and Post-glacial deposits, will be examined at certain typical localities.

Fossil-bearing Cambro-Silurian limestones in the vicinity of Winnipeg; the coal measures at Entwistle on the Pembina River, west of Edmonton; the coal beds at Carlsbad, and fossil-bearing Devonian-Carboniferous limestones in the same locality will be among the interesting features of this excursion. It may also be noted that Mount Robson, the highest peak in the Canadian Rocky Mountains, is observable from the railway. Arrangements, moreover, may be made to descend the Fraser River to Fort George, thence to Ashcroft by automobile and on to Vancouver over the line of the Canadian Pacific Railway.

### C.5—Lakes Erie and Huron. Time 14 days

The excursion through Lakes Ontario, Erie and Huron will include a visit to Niagara Falls. An opportunity also will be given for the collection and study of fossils from the Onondaga formation at Port Colborne and the Utica formation at Collingwood. In addition

a visit will be made to Manitoulin Island where there are noteworthy sections of Ordovician and Silurian strata with characteristic fossils. At Pelee Island the quarries with their Devonian fossils will also be inspected.

The Archean formations and their dependent topography, as well as the very pronounced, unconformable contact between these old crystallines and the Palaeozoic, are well exemplified in the Georgian Bay district, which is included in the arrangements. Walpole Island, on which there is an Indian settlement, will also be visited. This excursion gives an excellent opportunity for stratigraphic, glacial, and physiographic studies.

### C.6—Sudbury-Cobalt-Porcupine, Ontario. Time 12 days

The arrangements for this excursion are similar in all respects to those enumerated under the classification "A.3." save only that in this instance the starting point will be Toronto instead of Montreal. If necessary, provision will be made for yet another excursion to the mining regions of Northern Ontario.

### C.7—Vancouver Island. Time 4 days

Starting from Vancouver, the excursion comprises a journey by steamer to Victoria, the capital of the Province of British Columbia, and thence by rail to Nanaimo, an important coal mining centre on Vancouver Island. There will be opportunity en route to observe examples of peneplanation, glacial erosion and metamorphism. After visiting the coalmines and observing the coal measures at Nanaimo, the party will return to Victoria by rail.

### C.8—Yukon and Northern British Columbia. Time 23 days

Starting from Vancouver, the journey will be made by water to Skagway, Alaska, by rail over the White Horse Pass, and thence by steamboat down the Youkon River to Dawson City. The party will visit the Klondike gold field the Lewes River Valley, the Whitehorse copper district in the Yukon Territory, the Llewellyn Glacier, the Atlin gold mining district, the Skeena River mining regions, and the Portland Canal copper deposits in Northern British Columbia. A visit will also be paid to the copper and iron deposits on Texada Island in the Gulf of Georgia. The scenery on the mainland coast and islands to be observed on the passage to and from Skagway is exceptionally beautiful.

### C.9—Prince Rupert and Skeena River, B.C. Time 8 days

Starting from Vancouver, this excursion permits of a sea voyage of five hundred miles along the west coast of British Columbia, which is notable for its mountains and fiords. From Prince Rupert, the terminus of the Grand Trunk Pacific Railway, the journey will be made by rail up the Skeena River Valley to Hazelton.

### C.10—Athabaska and Peace River, Alberta. Time 13 days

This excursion is timed for a departure from Edmonton, coinciding with the arrival of those participating in the excursions "C.3" and "C.4."

Provisional arrangements have been made as follows. The party will proceed from Edmonton to Athabaska Landing by rail, thence down the Athabaska River to Grand Rapids and Fort McMurray; and, if deemed advisable, a steamer may be chartered on to Athabaska Lake, up Peace River to Vermilion Falls; also across Athabaska Lake and down Slave River to Slave River Rapids. Economic interest in this excursion centres mainly in the area of Tar Sands along the Athabaska

River. There are, for many miles, continuous exposures of Cretaceous rocks along the upper portions of both rivers, and flat-lying Devonian limestones along the lower.

**Guide Books.**

Guide books for use on the excursions are now in the course of preparation.

**Expenses.**

A definite statement of the cost of each excursion will be issued later. Meanwhile the following generalizations may be of some practical value:—

From Europe to Toronto, via Quebec or Montreal, the cost of a ticket for the single return journey will range between \$125.00 and \$350.00, according to the steamer selected and the accommodation desired.

In the larger Canadian cities the charges at hotels for board and lodging vary from \$2.50 per day and upward, but less expensive accommodation is obtainable at boarding houses in these cities, as well as at hotels in the smaller towns to be visited.

For the ten days of the meeting in Toronto special

accommodation will be provided by the University, at a cost of about \$2.00 per diem.

The value of the Canadian dollar in currencies of other countries is shown in the following table:

One dollar	=	Five francs, French.
" "	=	Four shillings, English.
" "	=	Four marks, German.
" "	=	Three kroner, seventy ore, Sweden.
" "	=	Five crowns, Austrian.

The active co-operation and sympathy of the various railway and steamship lines has already been generously offered.

**Correspondence.**

The Secretary will be pleased to answer all enquiries regarding the arrangements for the Congress. Correspondence should be addressed as follows:

The Secretary, International Geological Congress,  
Victoria Memorial Museum, Ottawa, Canada.

Cable Address:—GEOCONG, OTTAWA. Messages may be sent in any of these codes:

A.B.C. 5th, Lieber, Bedford McNeil, 1908.

## PROVISION FOR MINE RESCUE WORK IN BRITISH COLUMBIA

The British Columbia Department of Mines is continuing in its efforts to provide for the safety of the coal miners of the province. In this connection sites for two Government mine-rescue training stations have been secured — one at Nanaimo, on Vancouver Island, and another at Fernie, in Crow's Nest Pass district, Southeast Kootenay. Plans for the buildings have already been prepared and estimates of cost got out, so that it may be expected it will not be long before the work of erecting and equipping these stations will be undertaken. In regard to equipment, the Department of Mines now possesses a quantity of the Draeger oxygen breathing apparatus and requisite accessories, but it may be found necessary to obtain some additional equipment to make the provision for mine-rescue work ample. Of course the apparatus owned by the Government is supplementary to that the mine operators have had to provide under the law regulating the operation of the coal mines of the province.

**Oxygen Apparatus in British Columbia.**

The following list shows the total number of sets of the Draeger oxygen breathing apparatus and pulmotors provided at the various collieries and Government stations in the province:

	Complete Sets.
Two-hour Draeger apparatus . . . .	38
Half-hour Draeger apparatus . . . .	23
Four-hour Fluess apparatus . . . . .	6
One-hour Fluess apparatus . . . . .	3
Total . . . . .	70

Also ten Draeger pulmotors.

Numbers of men, including Government mine inspectors, company mine officials and miners, have taken the requisite course of training to enable them to use the apparatus effectively in cases of emergency. Fortunately few such have arisen in the province since

the provision of the apparatus and training of men in mine-rescue work, though the great value of the pulmotor for resuscitating those overcome by inhaling noxious gas has been demonstrated in several instances.

**Mine-Rescue Training at Nanaimo.**

It is gratifying to find that interest in mine-rescue training work is being well maintained at Nanaimo. The Western Fuel Company, recognizing the urgent necessity that exists for the protection of the lives of miners, so far as it is possible to make provision for their safety, was the first company in British Columbia to obtain oxygen breathing apparatus, and to its credit it should be noted that it did this before the enactment of the now existing law making provision of such apparatus by coal mine operators compulsory. Mr. Thomas R. Stockett, manager, and Mr. Thomas Graham, general superintendent, did all in their power to induce miners in the employ of the company to take the requisite training course so as to be ready, if occasion should arise, to use the apparatus in rescue work, and thus endeavor to save the lives of any men in danger in the mine should a disaster occur. For nearly two years training work has been going on at the station established by the company near the headworks of its No. 1 mine, Esplanade, Nanaimo. In February of 1911, on the occasion of a meeting of the Western Branch of the Canadian Mining Institute being held at Nanaimo, there was made at that station for the information of the visitors a demonstration of actual training in mine-rescue work. Throughout the year the training work was continued, under the direction of Mr. Graham. On January 1 of the current year he became Chief Inspector of Mines for British Columbia, and was succeeded as superintendent of the collieries by Mr. Thos. McGuickie, who also fully realizes the value of having a sufficiently large number of men trained in the use of the oxygen apparatus, so is keeping up interest in the training work.

On May 10 there was held in Nanaimo an interesting gathering, which took the form of a smoker, the chief purpose having been the presentation of certificates of competency in mine-rescue work to a number of members of the Western Fuel Company's mine-rescue corps. Among those present was the manager, Mr. Stockett, and other company officials; also, Mr. Graham, Chief Inspector of Mines. The certificates are suitable lithographs on parchment, ornamented with the figure of a man wearing oxygen breathing apparatus; the text attests the fact that the man whose name is on the certificate has passed the requisite course of training and is competent accordingly. There were 42 of the certificates presented. The full number of men belonging to this corps who have passed as efficient in mine-rescue work is 62, but one man has since died, so the strength of the corps is now 61. This includes all the company's mine officials physically fitted to undergo the course of training, which is by no means light, and a sufficient number of the miners to make the proportion of those competent

to undertake mine-rescue work four per cent. of the total number of the company's underground employees.

It is to be hoped the excellent example set by the Western Fuel Company in this direction will be followed by at least all the larger operating companies, so that all possible provision will thus be made for the protection of the lives of the miners. The great importance of the insistence of the Provincial Government on the provision of mine-rescue apparatus and the co-operation of the mine operators in making its use of real service in case of necessity, will be more apparent when it is remembered that in 1910 the number of men and boys employed in the coal mines of the province was 7,758, of which total 5,903 were employed underground. As the output of coal is increasing, it follows that the number of underground employees is becoming proportionately larger, so that the need for protection of the lives of between 6,000 and 7,000 miners and other underground employees is evident and one that may not be disregarded.

## PORTLAND CANAL MINING COMPANY, B.C.

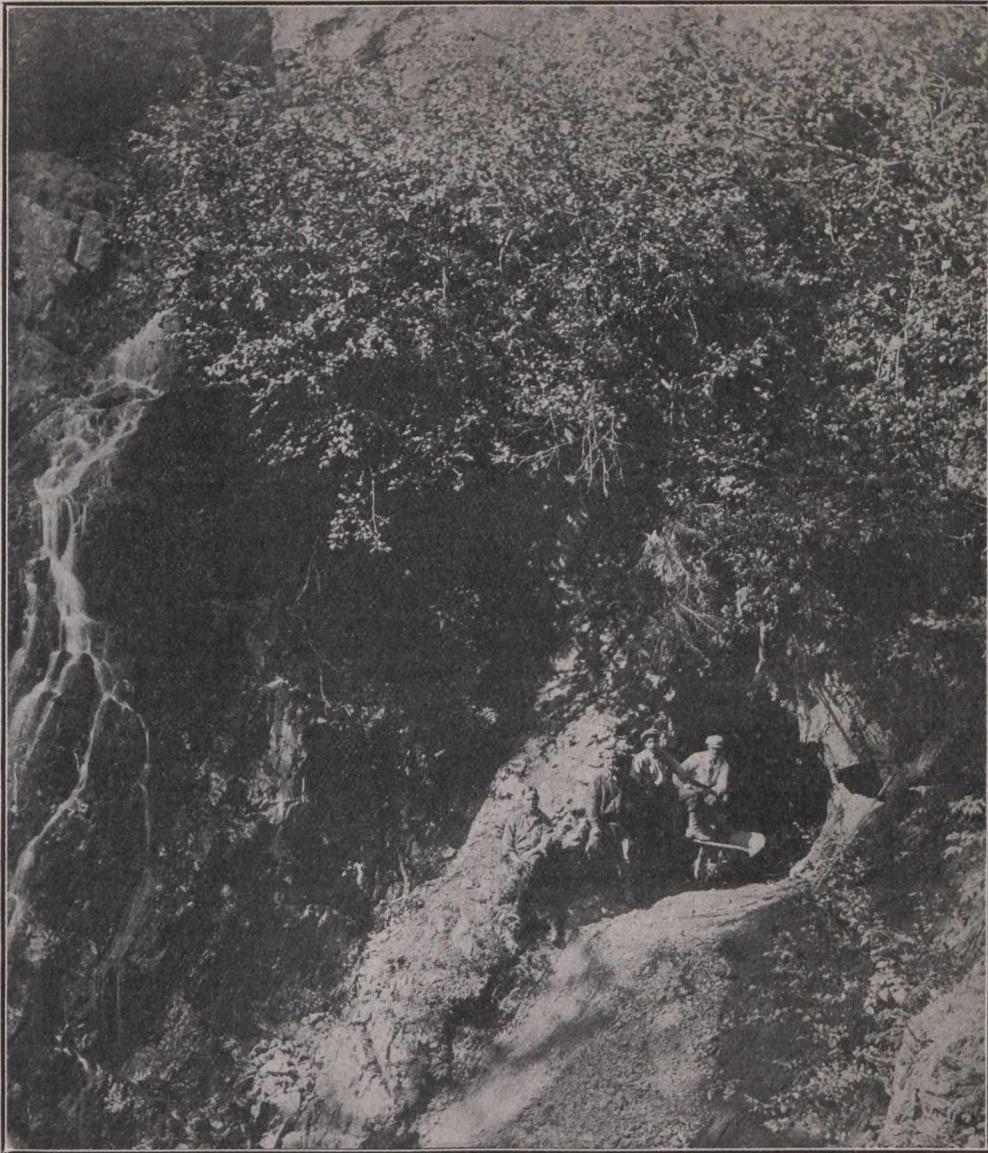
The fourth annual general meeting of shareholders in the Portland Canal Mining Company, Limited, which was opened at Victoria, British Columbia, on December 28, 1911, and adjourned pending continuance of negotiations for amalgamation of the company with other interests, was continued on April 26th. Included in the accounts submitted to the meeting was a revenue account showing a total expenditure during the fiscal year ended October 31, 1911, of \$83,332.48, and receipts of \$18,673.55, practically all from net proceeds of concentrates sold, which left a debit balance on revenue account of \$64,658.93.

The directors reported to the adjourned meeting that as mining and concentrating operations to be profitable would have to be on much larger scale than had been practicable under existing conditions, an amalgamation of several neighbouring properties had been under negotiation with Toronto capitalists, but as the necessary working capital had not been forthcoming, this proposal had had to be abandoned. However, while two of the directors and the general manager were in Toronto in March, negotiations with the representative of a large British company had been commenced and a definite proposal made to the directors. This proposal, if carried into effect, would provide for making available the requisite working capital, and the eventual liquidation of the company's debenture debt, besides leaving the shareholders a good interest in the property. The directors stated that if the various properties it is proposed shall be amalgamated satisfy the engineer examining them on behalf of the British company concerned, and be taken over by that company, the Portland Canal Company's position will be decidedly better than it is at the present time. It was pointed out that for some time past the directors have been personally contributing substantial amounts to meet the company's liabilities until such time as some arrangement shall be made that will be to the advantage of the shareholders.

The report of the company's general manager, Mr. W. J. Elmendorf, showed that delay had taken place last year in obtaining delivery of the machinery and

plant for enlargement of the concentrating mill to a capacity of 80 tons daily, which delay had seriously hampered the company. During the whole period the concentrator was operated about 7,000 tons of ore had been milled and approximately 2,100 tons of concentrates produced, of which 1,700 tons had been shipped and the remaining 400 tons loaded ready for shipment shortly. The average assay value of the ore sent to the mill had, however, fallen considerably. After careful experiments it was found that as mining had been carried on to the south and upward toward the surface the porphyritic gangue in the ore had increased in quantity, replacing the quartz, and that while the former rock was often well mineralized with pyrite and galena, these sulphides contained but small percentages of gold and silver. By the time this had been determined it was too late to mine away from the dike from which the intruded sheets of porphyry were off-shoots, for new stopes could not be quickly opened and the mine still maintain its full capacity output of about 100 tons a day. It was also not possible to break the ore free from the porphyry, as it was generally most intimately mixed. Then the travelling cable of the upper part of the aerial tramway became so worn as to be unsafe for use. Under the circumstances, and with winter approaching, it was decided to suspend operations pending making provision for working on a larger scale.

The manager said further, in his report: "The mine is by no means worked out. At the time we closed down it was producing about 100 tons a day with about 30 men in the mine. The porphyry dike is well defined on the surface and future development in the mine can be away from it. Its extent and position are even better shown by the underground workings and, apparently, the faces of both Nos. 2 and 3 drifts are beyond it. Drifting to the south will probably disclose new ore and the completion of the Max raise to the surface at what is known as the Upper Open Cut will, in all probability, put more than 200 feet of ore in shape to stope. The face of this raise is now in ore, and there is 8 feet in width of ore in the Upper



Typical Scenes—Portland Canal Mining District, B.C.

Open Cut. I am as strongly as ever of opinion that the mine is a good property and will be worked at a profit with further development. . . . With a larger basis of operations, extensive development of the vein or veins, increased milling capacity, and better facilities for mining, milling, and transportation, it is reasonable to expect a successful outcome to this enterprise, and ultimately a large and profitable mine. All this depends, without doubt, upon the opening of large ore-bodies of profitable grade, but I have yet to hear the first unfavourable opinion on this point from any competent engineer acquainted with the properties, and many such, including some men eminent in the profession, have visited these mines."

The reports and statement of accounts were adopted, and the following directors were re-elected:— Messrs. C. H. Dickie, J. A. Mara, J. R. Waghorn, A. Von Alvensleben, H. Martin, and T. A. Wood.

### SLIME TREATMENT.

At the plant of the Lord Nelson gold mine, St. Arnaud, Victoria, erected last year, slime from old dumps, containing 28 grains of gold to the ton, and slime from the mill containing 24 to 40 grains per ton are being treated. The slime from the mill consists of overflow from a classifier and from sand collecting vats. This amounts to about one ton per hour, carried in suspension in 8,000 gallons of water per hour.

The pulp is thickened in a simple settling tank to a consistency of from 1 to  $1\frac{1}{4}$  of water to 1 of dry slime. There is a continuous flow of the thickened pulp which is raised by air lift directly to the agitation vats. The clean overflow from the settling tank is divided into two streams, one stream being piped to the residue sump below the filters, and the other being delivered to a reservoir.

Although the old dumps contain considerable amounts of sand mixed with the slime, no difficulty is experienced in treatment, and no effort is made to size the material. It is found that a reasonable amount of fine sand mixed with the slime accelerates filtration.

Alloyed with steel, the elements carbon, nickel, and silicon yield compounds of great resistance to oxidation and corrosion. Steels carrying from 3.4 to 26 per cent. of nickel are much less susceptible to corrosion than are unalloyed steels. Tests made recently in which steel discs were immersed for long periods in fresh water, in salt water, and in sulphuric acid of different strengths, show that alloys of high nickel content have a remarkable resisting power.

In a letter to the "Engineering and Mining Journal" Mr. J. Parke Channing gives particulars of a device for the prevention of accidents in the case of overwinding in inclines, in use at the Burra Burra mine, at Ducktown, Tenn. The shaft here is of three compartments, sunk at an angle of 80 degrees from the horizontal. In the hoisting compartment two 5-ton skips are operated and between each skip and the hoisting drum is interposed a Humble disengaging hook. When overwinding occurs a copper pin is sheared, the skip hangs up and the end of the rope with its corresponding connection is freed. On the one occasion of over-

winding at this shaft, the device worked successfully and within an hour the skip was again in working order.

### CANADIAN MINING INSTITUTE.

At the recent annual meeting of the Canadian Mining Institute a resolution was adopted by which the secretary was instructed to communicate with the authorities to urge again that rescue apparatus for use in mines be admitted into Canada free of duty. At present such appliance is apparently classified under "machinery composed wholly or in part of iron and steel, not otherwise specified," and as such is subject to a duty of 15 per cent., if of British manufacture, 25 per cent., under the Intermediate Tariff, and  $27\frac{1}{2}$  per cent. under the General Tariff. Since most of the rescue apparatus imported is of German manufacture it is taxed at the higher rate. Mining machinery of a class or kind not made in Canada is admitted duty free; so are lifeboats and "life-saving apparatus imported by societies, to encourage the saving of human life." Mine rescue apparatus is not manufactured in Canada; it is for use in mines; obviously it is imported with a view to the saving of human life. Two or more years ago the Mining Institute brought the same matter to the attention of the Dominion Government, and received the assurance that mine rescue apparatus would be placed on the free list. It wasn't. The authorities now assert that they cannot act on the suggestion to classify mine rescue apparatus under "life-saving apparatus" or "machinery not manufactured in Canada," which would be a simple way of getting round a difficulty, if there is one; but add, that "the request will be laid before the Tariff Commission when appointed, as a change in the tariff would be required to meet the views of the Institute." This is a very fine sample of red-tape. As a matter of fact importers of rescue apparatus can now obtain a rebate of the duty by applying to Ottawa for it, which shows that the authorities sympathize with the importers' point of view. Mine rescue apparatus is not specifically mentioned in the tariff schedule. Hence to the mere outsider it would appear the simplest thing in the world to make a ruling that would settle the question and satisfy everybody. Since this is not so, importers must be content to wait until the "matter has received the consideration of the tariff commission," which has yet to be appointed.

### SIMPLE READING DEVICE FOR BURETTES.

A small mirror placed behind a burette admits of very accurate readings by bringing the meniscus in direct line with its reflection. A fine horizontal diamond scratch on the mirror renders the readings extremely accurate.

### AIR LIFT AGITATION OF PULP SLIME.

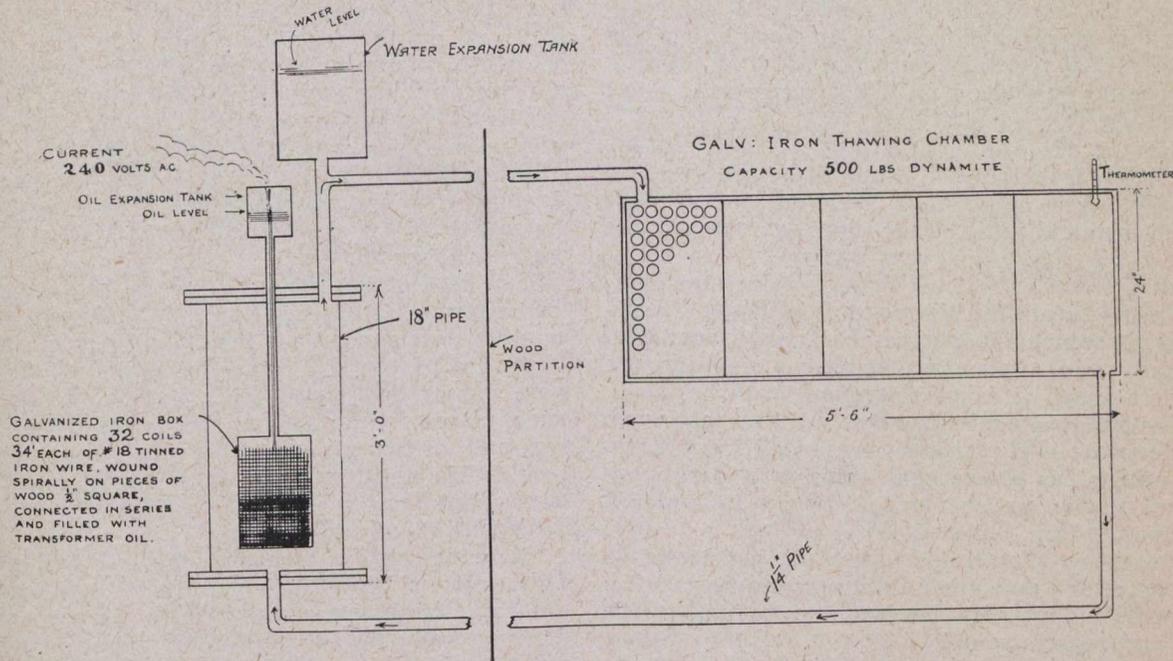
When slime is treated with sufficient lime to neutralize the ferrous sulphate and sulphuric acid the former is precipitated as ferrous hydroxide, which at once absorbs all the oxygen in the slime, and only a small percentage of which is changed into ferric hydroxide. Air lift agitation quickly introduces more oxygen, and at once changes the ferrous hydroxide into ferric hydroxide, and introduces the excess of oxygen, which is necessary for perfect conditions in cyaniding.

# A SIMPLE DYNAMITE THAWER

Contributed by W. H. DeBlois.\*

The accompanying sketch shows our underground dynamite thawer, which overcomes the objections to thawers operated by means of electricity and meets with the full approval of our Provincial Mine Inspector. The thawing chamber consists of a galvanized iron box divided for convenience into several com-

partments provided with padlocks. The heater was made from an old piece of 18-inch steel pipe, flanged top and bottom. Inside of this is a galvanized iron box containing the resistance coils and filled with transformer oil. The heater is about six feet distant from the thawing chamber and is separated there-



Apparatus for Thawing Dynamite by Water Electrically Heated

from by a partition. Using current at the rate of 1½ k.w. a temperature of about 83 deg. F. is maintained in the thawing chamber, which thaws the dynamite evenly and completely in about three hours. The circulation of warm water is, of course, aided by hav-

ing the heater somewhat below the level of the thawing chamber.

In view of the increasing use of electricity in mines, this thawer provides a very convenient substitute for steam.

## RAPID ESTIMATION OF ZINC.

The process is briefly as follows:—One to three grams of the zinc ore are dissolved in a mixture of 10 c.c. of nitric acid (density 1.2) and 20-30 c.c. of hydrochloric acid (density 1.9), preferably in a porcelain dish, so that the siliceous mass may be broken up with a pestle. After boiling for a while on a sand-bath, the whole is rinsed into a 200 c.c. flask, 50-60 c.c. of ammonia are added, and the solution is again boiled for a short time. When cold, dilute ammonia (1 : 3) is added up to the mark, and the solution is well shaken and filtered. One hundred c.c. of the filtrate are mixed with a little bromine water to precipitate any manganese, and the turbid liquid is then boiled with about one gram of aluminium scrapings until the copper present is all precipitated. Five c.c. of sodium sulphite solution (1 : 4) and a few c.c. of dilute ammonia are added, the liquid is again heated to boiling, and at once filtered; the residue is washed with a hot dilute ammoniacal solution of sodium sulphite.

The filtrate is neutralized with hydrochloric acid, and an extra 10 c.c. of dilute acid (1 : 3) is then add-

ed. After diluting to 150 c.c. and heating to boiling, the zinc is at once titrated with ferro cyanide (21.63 grams of potassium ferro cyanide and 14 grams of crystallized sodium sulphite per litre), using ammonium molybdate solution (9 grams per litre) as external indicator. The end reaction is shown by the formation of a reddish-brown spot.

## MACHINE STOPPING AT SIMMER DEEP.

At the Simmer Deep mine on the Rand 66.5 per cent. of the tonnage mined was broken by machines last year, as against 49.7 per cent. in 1910. Notwithstanding this extended machine stopping, it was found possible to keep an average stopping width of 57½ inches, which corresponds to the actual width mined on the basis of tonnage removed from stope faces. More ore by 101,000 tons was mined last year than in the preceding twelve months. By means of small rock drills of the hammer type it is hoped eventually to compete successfully with hammer boys in cost as well as in width of stopping.

\*Superintendent The Nichols Chemical Company, Limited, Sulphide, Ont.

## SPECIAL CORRESPONDENCE

### ONTARIO

#### PORCUPINE AND SWASTIKA.

The new ore body at the Davidson property, on which the final payment has just been made by the Crown Chartered Company, has been developed for 30 feet. A cross-cut has shown that the ore body when first struck was at least 20 feet wide, and, according to the channel samples taken, this promises to be all good pay ore. Work is at present confined to opening up another level at 200 feet, and both the old and the new ore body should be opened up this month as the plant is now running very smoothly.

The shaft at the Mulholland property in Whitney township is down to 170 feet, and will be continued to 200 feet. Work is being done by hand, and a plant will not be installed until better showings warrant the outlay.

It is stated that the Foley-O'Brien is to resume operations. In the meantime the council of South Porcupine want to secure one of the shafts as a source of water supply and application has been made to use some of its acreage as a burial ground.

Of all the outlying townships where assessment work is being done the best results are reported from Turnbull. Sampling has shown that values are fairly consistent and the veins are large enough to warrant further investigation.

An examination of the Rea mine has been made by the new directors and their technical advisers. An attempt will undoubtedly be made to re-finance the company and resume work.

It is understood that an attempt is being made to merge the two power companies—the one operating and the other preparing to operate in the Porcupine camp. If the merger were effected the Porcupine camp would have at its service between 11,000 and 12,000 horse power. The Timmins-McMartin-Dunlap syndicate controls the Sandy Falls plant, which is now delivering power; and a Montreal syndicate, of which Mr. Lorne McGibbon is president, has control of the Waiwaiten plant, which should be completed about August.

Owing to the delay in the delivery of machinery the Vipond mill will probably not be running till the early days of next month. The construction of the mill is almost completed.

While the Hollinger mill has made great headway during the past month, there is much yet to be done, and it is not probable that the first run will be made until well into June.

It is reported that the Dome Lake mill will be completed in August. The mill run of ore at the Kingston School of Mines was very satisfactory to the management.

Quite a number of prospectors are travelling east from Cochrane to the Harricanaw River and are following it north to a new field found during the winter. Quartz veins carrying coarse gold are being stripped, but it is reported that so far the pay streak is narrow.

#### COBALT NIPISSING.

The April report of the Nipissing Mining Company is of more than usual interest, inasmuch as it gives in addition to the development of the month a resume of the work undertaken and work planned by the company.

The shipments during the month of April amounted to \$229,682, and the production during the same period totalled \$225,145, all net. Of the latter amount No. 73 shaft contributed \$184,271. The best development of the month was at vein 122. In putting up a raise from the intermediate raise from the first level, ore was encountered about sixty feet from the surface. A drift was started on this ore and is in to the shoot twelve feet. There is ore in the back and in the bottom of the drift and up the face the entire nine feet in height. The width of the vein in the face averages six inches and the ore will assay about 5,000 ounces. This promises to be the best development on vein 122 since the original ore body was found two years ago.

At shaft 73, the fault which has thrown the vein throughout these workings has been encountered in the east drift. A cross-cut has been started to pick up the vein above the fault.

Some idea of the low-grade ore to be encountered in the Nipissing workings may be inferred from this month's development on the third level of the Meyer. The sides of the drift have been scaled off and this work shows that there are a number of stringers in some places ten to twelve feet away from the main vein and all this ground will probably make good mill rock. The shaft will be sunk further and another level opened up, as it is believed that the conglomerate is dipping steeply to the east.

The main shaft at 64 has reached a depth of 343 feet. This shaft is being sunk purely for exploration purposes and is outside of the vein in the Keewatin. Some drifting was done on the fourth level and a raise was put through to the third level, but without favourable results.

Cross-cuts are being run from the second level of the shaft 73 towards the La Rose shaft and towards the Cobalt Lake, to prospect the hill on which the north end of the town is situated. A cross-cut over 700 feet long has been driven down Argentite Street, almost to Cobalt Station. The only result was the cutting of one calcite vein.

The old Kendall vein has definitely resigned first place among the Nipissing producers to the Meyer and little ore is now being taken out of it. A cross-cut from it 697 feet long has been run down the Little Silver Hill with the result that several stringers have been picked up and these will be investigated.

The high-grade mill treated 147 tons of ore during the month and shipped over \$200,000 of bullion.

Good progress has been made with the construction of the low-grade mill. The battery building is now up and the framework completed over the tube mill building. The concrete foundations for the wall are all in. A considerable portion of machinery is already on the ground.

#### COBALT TOWNSITE.

The Cobalt Townsite Mining Company occupies a unique position; it is the one company operating in Northern Ontario and controlled by English capital that has paid a dividend; furthermore, it has only obtained that position this year, though it has been operating since 1906. A shaft was sunk and small shipments made from an ore body near the southwest corner of the property, but in 1908 the mine was closed down and so remained for about six months. Work was resumed under the mine management of Mr. John

Redington, who first saw and developed the possibilities of the northeast corner of the property. He was succeeded by Mr. C. E. Watson, who is consulting engineer for the company, but the mine has been nursed into the position of a dividend earner by Mr. A. C. Bailey, who has been in charge now since Mr. C. E. Watson left the camp for Porcupine. At the present time the Cobalt Townsite is employing about 180 men, of whom 110 are working in the mine, 50 on the surface, and 20 on construction.

The weekly production of the mine is slightly in excess of 30,000 oz. of silver, which at present price of silver is worth approximately \$17,000 per week. The weekly expenses run in the neighbourhood of \$5,000.

The company is treating 75 tons a day of low-grade at the Northern Customs mill under contract, having some years to run. About a year and a half ago the Northern Customs Company built an extension to its mill for the exclusive use of the Townsite Company and this extension contained 20 stamps. Shortly afterwards the Townsite Company found it necessary to arrange for the use of ten additional stamps, or a total capacity of 75 tons a day of low-grade. At the present time work is being pushed rapidly for a further extension of the mill to contain twenty additional stamps for the use of the mine, to be completed about the 1st of August next. The Townsite Company will then have in operation fifty stamps treating 125 tons of ore a day.

Present developments underground have been chiefly in the neighbourhood of No. 1 shaft, situate at the northeast corner of the property, but a new shaft and ore house have just been completed on the shaft known as No. 2 and situated about 200 yards west of shaft No. 1, and are now in operation. The principal developments are on the 100-foot level and the 200-foot level, where the formation is conglomerate and slates. No. 2 shaft is designed for handling rock and ore from the 100-foot level, as developments have been so extensive that it has been found impossible to satisfactorily handle the ore from both levels from the one shaft.

The company is also mining the south boundary from the Right of Way workings, having leased the southerly shaft, ore house, etc., of the Right of Way Company, and are engaged in taking out ore from two veins which run into the Townsite property along the boundary line of the Right of Way Company.

Considerable diamond drilling has recently been done on the property, which it is understood has shown the conglomerate formation to be considerably deeper than anticipated, and it is now proposed to re-open the old shaft situated near the southwest corner of the property to cross-cut two veins of high-grade at the 100-foot level. The core from a diamond drill working in this vicinity showed silver believed to be from these veins.

It will be noted from the weekly shipments returns of the camp that the Townsite mine stands fifth in point of tonnage for this year, and in this connection it must be borne in mind that with the exception of slimes from the picking belt and from the mill, nothing has been shipped this year except high-grade ore and concentrates.

The management consider they have enough high-grade and low-grade ore blocked out and in sight to maintain the present rate of production for at least two years.

The Canadian company, is, of course, really an operating company, all the shares being owned by an Eng-

lish company of similar name with head office in London. The shares of the latter company are listed on the London Stock Exchange and are held almost exclusively in Great Britain, France and Belgium.

Since the first of January, 1912, dividends have been paid in England, amounting in all to 15 per cent. At the annual meeting held in London in January last it was announced that a quarterly dividend of 5 per cent. would be paid, and, in addition to the two quarterly dividends, a 5 per cent. each in January and May. Two bonuses aggregating 5 per cent. have also been paid.

At the present time a winze is being sunk for the purpose of making a new level at a depth of about 275 feet, at the main shaft diamond drill tests having proven the formation to continue at least to this depth. The past two or three years the direction of the affairs of the company have been in charge of a board of directors, most of whom are Toronto men, with Mr. W. R. P. Parker as president, Mr. J. P. Watson as vice-president.

## BRITISH COLUMBIA

It is noteworthy that for the first time in recent years a dividend has been paid by a mining company operating in Slovan district, namely the Standard Silver-Lead Mining Company, which owns the Standard group of mineral claims, situated in Four-Mile Camp, near Silverton, Slovan Lake. This company was organized late in 1910; it acquired the mining property previously owned and developed by Messrs. J. A. Finch, of Spokane, Washington, and Geo. H. Aylard, of New Denver, B.C., and last year it constructed an aerial tramway from the mine down to the mill-site near the shore of the lake, put in a water system to supply water for power and concentrating purposes, installed a compressor plant with an air line to convey compressed air to the mine, erected and equipped a concentrating mill, and late in the year commenced to ship sorted crude ore and silver-lead concentrate to the smeltery at Trail. Since then profits have been accumulated until, in April, a first dividend was declared on the authorized capital of \$2,000,000. The total amount of this first dividend was \$25,000; it is intended to pay \$50,000 in May, and each following month, at which latter rate the dividend will be equivalent to a distribution of 30 per cent. per annum. There are other mines in Slovan district which are expected to ere long be again on the dividend-paying list—notably the Rambler-Carbioo, which has much ore developed awaiting the construction of an aerial tramway down to its new mill-site, the erection of the mill, and the completion of the branch railway line from the C.P.R. Co.'s Nakusp-Sandon railway.

### Outlook for Granby Company.

The following is an excerpt from "Walker's Weekly Copper Letter," published in the "Boston Commercial" of May 12:

"Granby directors have authorized the management to begin work immediately on the construction of a 2,000-ton daily capacity smeltery at the Hidden Creek property. Other construction will include an electric railway from the mine to the smeltery and thence to the docks. The ore haul will be about a mile and the distance from the smeltery site to the docks is a little less. Hydro-electric power, sufficient for all uses at mine and smeltery, will be developed on a stream near by.

"No arrangement for new financing has been made. The company has enough money to proceed with the development of the mine, construct the railroad and docks, and put in foundations for the new plant. Meanwhile it is earning approximately \$100,000 a month. It is probable the entire new plant will be paid for out of operating profits.

"Diamond drilling and development work have proved Hidden Creek ore-bodies to be both larger and higher in grade than they were believed to be when the property was purchased. More than 12,000,000 tons of self-fluxing smelting ore, which will average over two per cent. copper and contains 30 cents a ton in gold, has been demonstrated.

"It is figured that the company will make copper at Hidden Creek cheaper than it does at Phoenix and Grand Forks. Mining costs will be about the same; but there will be a saving of 23 cents a ton one ore transportation, and only half as much coke will be required to smelt a given tonnage of ore. The cost of transporting a ton of bullion to the eastern refineries will be 50 cents less than it is from Grand Forks.

"The new plant, which will cost \$1,700,000, will be completed within 18 months to two years. It is expected to turn out 30,000,000 lbs. of copper annually, giving Granby a total yearly production of 45,000,000 to 50,000,000 lbs.

"General Manager Graves says Granby is now treating a larger tonnage of ore at Grand Forks—more than 3,500 tons daily—than ever before, and at lower cost per ton. This ore yields about 18½ lbs. of copper and 75 cents in gold and silver per ton. He says the future outlook for Granby is brighter, and that its assets are worth more than at any previous time in the company's history.

"I figure that when Granby gets itself into a position where it can produce 45,000,000 lbs. of copper annually at a cost of ten cents, it will earn \$18 a share yearly on a 16-cent market, or \$9 on 13-cent copper."

#### Motherlode Sheep Creek Mining Company.

Announcement has been made that crushing ore was commenced at the Motherlode Sheep Creek Mining Company's new mill at Sheep Creek, Nelson mining division, on May 4. As this is the first mill fully equipped with modern gold-saving appliances established in Kootenay, it marks an advance in gold-milling practice in that district.

Three years ago Mr. Wm. Watson, of New York, a well-known mining engineer, (brother of Mr. Raoul Watson, of La Rose and Nipissing mines, Cobalt), examined and reported on the Motherlode property, then only a prospect. Later he undertook the development of the property for his principals, chief among whom is Mr. John McMartin, known as being prominently connected with Nipissing, La Rose, Hollinger, and other important mines in Northern Ontario. The Motherlode mine was developed to a depth of 500 ft. below the ore outcrop, and it was thereafter decided that there was a sufficiently large quantity of ore available to warrant the erection and equipment of an up-to-date stamp mill and cyanide plant. First, though, bulk samples of the ore were submitted experimentally to various treatment methods so as to determine which would be the most advantageous to adopt for this particular ore. The provision of the requisite gold-saving facilities was commenced last summer, but as the winter was far advanced before the mill and all auxiliary plant were completed, it was decided to wait until

spring before turning water in to the stave-pipe line, which might have been damaged by the sharp frosts of winter had an attempt been made to use it during that part of the year.

Beside the 10-stamp mill, an aerial tramway 3,600 ft. long, with a difference of about 1,000 ft. between elevations of terminals, was constructed; also water lines for power purposes. The water system includes two red fir continuous stave pipe lines conveying water to a 7,000-ft. line of steel pipe graded from 16 to 14-inch in diameter, which delivers water at the mill at an average effective pressure of 600-ft. head. Power is obtained from six specially designed Pelton water-wheels, which drive all mill machinery, and a compressor having a capacity of 1,440 cubic feet of free air per min.

The mill and cyanide plant include Blake crusher, ten 1250-lb. stamps, Merrill's patent sizing cones, tube mill, amalgamating plates, Dorr continuous thickeners, Aldrick slime pumps, four 8x25 ft. Pachuca tanks, cyanide vats, Merrill's clarifying and precipitation presses, and a full complement of accessories. The erection of the building and arrangement of plant have been carried out so as to allow of the addition of five more stamps and another tube mill at comparatively small further cost. The best talent available has been employed in designing and equipping the mill, which it is believed will prove to be one of the best gold-savers in the world. It is estimated that there is about three years' supply of ore blocked out. Altogether a successful and profitable outcome of this enterprise is confidently looked for.

Late advices from Montreal are to the effect that Mr. Henry Timmins has joined the directorate of the Motherlode Sheep Creek Mining Company, stock in which is now being quoted in the New York market.

#### General Mining Notes.

At the Standard mine, Slocan, the raise from No. 6 to No. 5 level has been completed. Another level, 750 ft. vertical depth below No. 6, is being extended and a little ore is being met with in the drift.

Attention is being given to several mining properties in the South Belt of Rossland camp, where the Blue Bird and Richmond claims, among others, are being developed with encouraging results.

The development of the Red Cliff copper property, in Portland Canal mining division, is being continued. Reports of the intention of the Red Cliff Company to ship ore to a smeltery are again being circulated.

In the Coast district, the Britannia is making a comparatively large output of copper ore and concentrate, which is being shipped to the smeltery at Tacoma, Puget Sound, Washington, for treatment. A bigger output is being prepared for.

It has been estimated by the United States Geological Survey that Alaska mines produced 22,000,000 lbs. of copper in 1911. This is by far the largest output of this metal ever made in one year by Alaska, and it is due to the fact that the production of copper has been commenced at mines in the Copper River district and to an increased output from mines in Prince William Sound district. The Copper River railway was completed to the Bonanza mine, and shipment of ore was begun, in April, 1911, and was continued throughout the year. There was also a marked increase in output of the mines of the Prince William Sound district.

## GENERAL MINING NEWS

### NOVA SCOTIA.

**Scheelite, Halifax Co.**—Mr. Victor Hills has resigned the position of manager of the tungsten mine at this place and Mr. A. L. McCallum, B.Sc., is in charge of operations. Mr. McCallum is a graduate of McGill and has had long experience in Nova Scotia. For some years he has conducted a consulting practice in Halifax, where he also runs an assay office. On several occasions he has been called upon to carry on important investigations for the Nova Scotian Government and for large corporations.

**Halifax.**—It is announced that the Wabana installation of the Nova Scotia Steel & Coal Company is now about completed, and a very large amount of the ore mined now is coming from the submarine areas, and this portion is being increased every week. The equipment installed has been pronounced by many engineers to be unequalled for simplicity and efficiency, and is furnishing ore at an extremely low cost of production.

Advices from the company's plant at New Glasgow indicate that business is unusually good and that the prospects are for a record year for the company.

### QUEBEC.

**Montreal.**—A suit which involves a block of 569,960 shares of the Crown Reserve was heard by Mr. Justice Demers on May 20th and taken en delibere. John Black et al. formed the syndicate who originally owned this property and are the plaintiffs in the present suit against the company.

It appears that when the company was formed the present Crown Reserve property at Cobalt was acquired from a syndicate composed of the six plaintiffs who now figure in the case, and others, and it is claimed that, apart from allocations of stock made in favor of each member of the original syndicate, a stock of 569,950 shares was set aside to be transferred by the trustees of the syndicate to the directors of the company for the purpose of providing funds for the organization of the company and for working capital as the directors might deem prudent from time to time.

Of this number of shares, 338,807 have been disposed of to date, leaving a balance of 231,143 still in the hands of the directors for the purposes above specified.

The plaintiffs maintain that the flourishing condition of the company, which, with its reserve of \$750,000, has earned more than double of the capitalization of the company, puts an end to the trust whereby these shares were held by the directors and that the directors in fairness cannot claim that they require any further working capital. Hence they claim that the residue of 231,143 shares should be distributed pro rata among the original members of the syndicate.

The company on the other hand contend that the members of the original syndicate in accepting the allocations of stock coming to them gave a discharge to the trustees of the original syndicate which amounted to a discharge in favour of the company, and that in consequence they have no proprietary right to the shares involved in the suit. Moreover, even if they were to be considered as having any such proprietary right, the company points out that the properties are

not fully developed and consequently there may be further calls upon the working capital represented by the shares.

### ONTARIO.

**Toronto.**—The property, plant and concentrating mill of the Nova Scotia Silver Cobalt Company was offered for sale at public auction on May 20th, and was disposed of to the highest bidder, D. M. Steindler, of New York, for \$82,000, an amount equal to about 33 1-3 per cent. of the current liabilities.

The purchaser was the president of the defunct company and appeared with his associates as one of the biggest creditors holding notes, etc., against the concern to the amount of \$145,098.

Scotia Cobalt has a capital paid up of \$2,500,000. The directors were D. M. Steindler, president, New York; M. B. Davis, vice-president, Montreal; J. A. Jacobs, Montreal; A. M. Reaper, Montreal; L. A. Bayley, Montreal. From time to time the company found very rich ore on its property, but these turned out on subsequent development, to be rich pockets.

**Toronto, May 22.**—The Pearl Lake Gold Mines will not have to go under the hammer after all, it being announced that a deal has been closed with New York and Philadelphia capitalists to finance the property and pay its debts.

The debts of the company, which were reported to be about \$100,000 in all, have been provided for and will be paid off by funds provided by the purchasers of the controlling interest.

A sufficient amount has been lodged with Mr. G. T. Clarkson, the assignee in charge, to liquidate the pressing indebtedness at once, and the remainder will be cleared up in the near future.

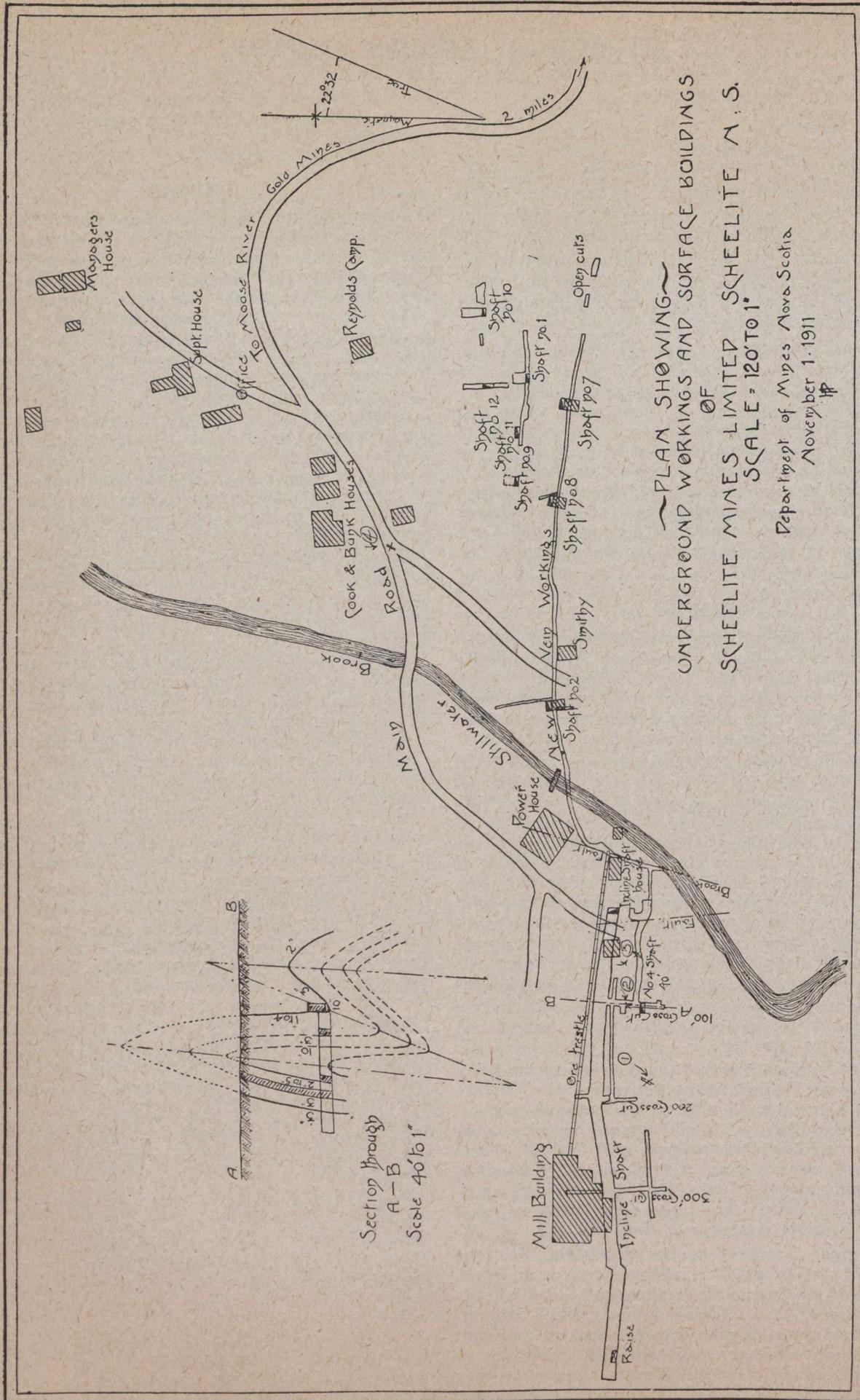
Burr E. Cartwright, the present president of the company, will be retained on the board, but his interest will be a minority one only, as he has sold control to the new interests.

Pearl Lake property is very well regarded, and has the deepest shaft in Poreupine.

**Cobalt, May 16.**—Returns have just been obtained from the first carload of concentrates despatched from the new mill at the Beaver and, as the practice here is a new departure in the camp, they are important. The mill, which is treating on an average about 60 tons per day, was constructed at a cost of \$48,000, and in place of the stamps uses the Hardinge ball and pebble mills as fine grinders. The concentrates shipped to the Deloro smelter ran 1,300 ounces to the ton and the management state that the thirty-three tons netted them \$20,000. There is also on hand at the mine now from a half to two-thirds of another car ready for shipment.

Ore is being raised for the mill and for shipment direct from four levels, the lowest of these being the 500-foot. The lowest actual level is at 530 feet, where a smallite vein is being drifted upon with good prospects of running into a shoot of ore soon. About half of the Beaver silver comes from high-grade and half from concentrates.

**Cobalt.**—The construction of a mile of aerial tramway between the Savage and the McKinley-Darragh for transporting to the McKinley-Darragh mill the milling rock from the Savage dumps will be begun within a few weeks.



PLAN SHOWING  
 UNDERGROUND WORKINGS AND SURFACE BUILDINGS  
 OF  
 SCHEELITE MINES LIMITED SCHEELITE N. S.  
 SCALE - 120' TO 1"

Department of Mines Nova Scotia  
 November 1, 1911

Section through  
 A-B  
 Scale 40' to 1"

(See overleaf)

The tramway will be one of the biggest undertakings that the McKinley-Darragh has attempted. A single span of 800 feet will be necessary at Cart Lake just before the Savage end of the line is reached and the ore will have to be taken over a high hill that intervenes between the two properties.

The rock at the Savage, which is to be treated at the McKinley-Darragh low-grade mill, has been accumulating for two years and now amounts to more than 20,000 tons. All of this rock averages 20 ounces to the ton at least and much of it runs more than that. The tramway was devised as a substitute for a low-grade mill which has for some time been projected for the Savage property. The fact that the McKinley-Darragh mill can handle the rock has changed the plans of the management, however, and substituted the tramway idea in place of the more expensive plan of building an additional mill. The structure will cost \$20,000 and will require about three months to build.

**Cobalt.**—A start has been made with the construction of the addition to the Northern Customs Concentrator plant at Cobalt, where, by August, the company expects to have forty more stamps dropping, bringing the full battery up to 120 stamps. Upon this extension the company is spending \$75,000.

**Haileybury.**—It has been decided to make the mill for the Casey-Cobalt a ten-stamp mill. The original plans were for a five-stamp mill, but the recent developments at the property are held to justify the building of a mill of double that capacity. A large portion of the machinery has already been brought in for the mill and the balance will be delivered inside of three weeks. Construction has been started on the building and the foundations for the motors are finished. The mill will have 10-standard 1250-pound stamps and the new patent Isbell vanners are to be installed. This vanner is also being tried out at the Northern Customs concentrator in Cobalt. A large amount of ore has been blocked out at the mine in readiness for the mill. Additions are also being made to the operating plant at the Casey-Cobalt. The order has been placed for an eight-drill steam-driven Sullivan compressor. Work at the Casey so far has been done with two small three-drill machines and these are to be retained as auxiliaries when the new machine is in use.

**Cobalt, May 25.**—Over thirty prospectors have left here during the past few days for Massey at the Soo branch, in response to a call for prospectors sent to

town on Tuesday that gold has been discovered in that section. A larger gang of men will leave to-day for the new fields, while other towns in the district will also send their quota of prospectors to the new fields. Little is known in Haileybury of the finds, but the prospectors are all obeying the impulse to go in on the ground floor, if it is any good.

**Porcupine, May 20.**—Plans for the building of the Dome Lake Mines' stamp mill and tube-mills are out, and ground is being broken for the basement of the structure.

Ten stamps will be operated with tube-mills, which give an added capacity of ten stamps, a total of 100 tons every 24 hours.

The Dome Lake's property consists of three 40-acre claims adjoining the West Dome on the South, and two claims southwest of the Big Dome. Manager McKenzie is in charge of the work.

The new compressor plant of the style and pattern of the Dome Extension outfit, is being installed and will be ready for operation within two weeks. Forty men are employed.

## YUKON.

A despatch received from the Yukon states that seven out of a total equipment of nine dredges are now in commission. There is an abundance of water and the boats are operating entirely satisfactorily. In all probability dredge No. 8 has begun operating by this time.

The first boat was placed in commission on May 3rd. The average start for the boats last year was May 6th. Although some of the dredges last year began operating earlier than this year, owing to the number of boats which were placed in commission this year, the start is in reality an earlier one.

During 1911 the Yukon made net profits of \$1,313,450. As this fell somewhat short of the dividend which was being paid at that time, which called for approximately \$1,400,000 per annum, the company in December reduced the rate from 8 per cent. to 6 per cent., the present disbursement calling for \$1,050,000. The decrease in earnings for 1911 from those of 1910 of \$1,400,000 was due to an extraordinarily dry season resulting in a scarcity of water which reduced the length of the dredging season. It was expected in 1911 that a considerable increase would be shown over the figures for 1910.

## COMPANY NOTES

### Crown Reserve Dividend.

The Crown Reserve Company has declared a dividend to-day of 2 per cent. with a bonus of 3 per cent. payable June 15th, to shareholders of record May 31st. Books will not close.

### The Jupiter Report.

At the annual meeting of Jupiter Mines, Limited, held in Toronto on May 20th, President T. H. Hamilton said, in part:

"Operations on a serious scale began on the first of June last, and have been pushed along as rapidly as has been economically possible. We have two series of veins on which shafts have been sunk 200 and 300

feet. One series is evidently very rich; the other series, which is not so rich, makes up for this in quantity. Our endeavour has been to find ore and put it into an economical condition for extraction, and I am able to tell you that during the past year we have justified our actions in expenditures.

"I am convinced in my own mind that we have a very valuable property, and we have every reason to believe that the next six months will afford us sufficient data to warrant the installation of a modern plant. Our endeavour has been to carry operations on underground with all possible speed and to keep down expenditures on the surface to the lowest possible point, and thereby to put as large a tonnage of ore in sight as possible at a minimum expense.

"So far as the present market value of our shares is concerned, I may say that it is a matter that does not interest us in the slightest degree. We have, we believe, a very bright 'prospect' in the Jupiter, and we are devoting our whole attention to developing the property along thoroughly sound lines, which course, we believe, our shareholders will endorse."

The report of the consulting engineer, R. W. Brigstocke, said, in part:

"The work done on the Jupiter Mines has been naturally of an exploratory nature only, specially planned and carried out with the object of proving the existence of profitable ore. This exploration has been most encouraging. The No. 1 series of veins have been opened up at the 50, 100 and 200-foot levels, and at each level profitable ore has been found. The No. 2 series of veins have been opened up at the 100, 200 and 300-foot levels. On the 100-foot level 20 feet of profitable ore was cut, but owing to the proximity of the lake, very little underground exploration was attempted. On the 200 and 300-foot levels, there is every evidence of the extension of this ore body, which is most gratifying.

"No. 1 series of veins indicates a width of three feet, and a value of \$2 to \$25 per ton in gold. The other series indicate greater widths and \$10 per ton in value.

"The rocks are soft and the ground will be mined very cheaply. A very good indication of this is the amount of work accomplished underground, namely, 3,000 feet for less than \$100,000, including surface expenditures on buildings and equipment.

"It is a very interesting detail, but a fact that phenomenally rich ore exists in the Jupiter mine. Assays of samples, properly cut across the vein, have given in a great many cases, extraordinary results, and while it is somewhat dangerous to lay too much stress on the results of such samples, they must, when properly taken, be reckoned with.

"In arriving at the average of assay values, results of samples of extraordinary richness have been excluded.

"Everything looks well for the Jupiter, and if expenditures are made along reasonable and sane directions, the outcome will be gratifying."

## STATISTICS AND RETURNS

### NOVA SCOTIAN COAL SHIPMENTS.

#### Springhill Collieries (Dom. Coal Co.).

Shipments, April, 1912 .....	29,941
Shipments, April, 1911 .....	6,162
Increase, April, 1912 .....	23,779
Shipments, 4 months, 1912.....	118,710
Shipments, 4 months, 1911.....	25,562
Increase, 4 months, 1912.....	93,148

#### Inverness Railway & Coal Company.

Shipments, April, 1912 .....	21,970
Shipments, April, 1911 .....	14,565
Increase, April, 1912 .....	7,405
Shipments, 4 months, 1912.....	82,918
Shipments, 4 months, 1911.....	76,475
Increase, 4 months, 1912.....	6,443

#### Acadia Coal Company.

Shipments, April, 1912 .....	30,144
Shipments, April, 1911 .....	31,267
Decrease, April, 1912 .....	1,123
Shipments, 4 months, 1912.....	118,636
Shipments, 4 months, 1911.....	123,489
Decrease, 4 months, 1912.....	4,853

#### Nova Scotia Steel & Coal Company, Limited.

Shipments, April, 1912 .....	51,109
Shipments, April, 1911 .....	25,041
Increase, April, 1911 .....	26,068
Shipments, 4 months, 1912.....	153,173
Shipments, 4 months, 1911.....	108,496
Increase, 4 months, 1912.....	44,677

### Intercolonial Coal Company.

Shipments, April, 1912 .....	16,476
Shipments, April, 1911 .....	20,477
Decrease, April, 1912 .....	4,001
Shipments, 4 months, 1912.....	71,687
Shipments, 4 months, 1911.....	83,837
Decrease, 4 months, 1912.....	12,150

### Cobalt Ore Shipments.

Only seven mines shipped ore from Cobalt last week, almost as many shipping bullion. Ore shipments for week and year in pounds of ore are:

	Week May 17	Year to date.
Beaver.....		250,658
Buffalo.....	61,400	947,754
Can. Gowganda.....		15,967
Casey Cobalt.....		549,000
Chambers-Ferland.....		323,500
Cobalt Lake.....		351,198
Cobalt Townsite.....	60,795	1,061,329
Colonial.....		83,200
Coniagas.....		1,533,573
Crown Reserve.....		422,104
Drummond.....		604,000
Hudson Bay.....	125,493	626,290
Kerr Lake.....	40,203	657,223
La Rose.....	129,211	2,625,021
Mann (Gowganda).....		40,000
McKinley.....	53,942	1,986,820
Millerett.....		156,000
Miller Lake-O'Brien.....		146,500
Nipissing.....		1,629,300
O'Brien.....		526,898
Provincial.....		44,440
Right of Way.....		290,296
Temiskaming.....	83,514	833,199

Trethewey .....	326,999	
Wettlaufer .....	216,470	
<b>Totals .....</b>	<b>454,565</b>	<b>16,624,753</b>
Bullion shipments for the week:		
	Ounces.	Value.
Kerr Lake .....	2,774	\$ 1,702
Nipissing .....	76,490	56,403
O'Brien .....	15,598	10,787
Buffalo .....	75,000	45,000
Crown Reserve .....	6,060	3,272
Colonial .....	1,698	1,018
<b>Totals .....</b>	<b>110,110</b>	<b>\$77,683</b>

Both bullion and ore shipments from the local mines for the week ending May 25th were small. Coniagas and the Nipissing each shipped large quantities, but the rest of the mines were below the usual quantities. La Rose, McKinley-Darragh, Chambers-Ferland and the Crown Reserve were the only other mines that sent out ore.

The shipments for the week were:—

	Ounces	Value
Nipissing .....	30,222	\$18,548.74
McKinley-Darragh .....	7,799	4,679.00
	38,021	23,227.74
	1912.	1911.
Nipissing .....	\$1,483,651.72	\$854,937.46
Crown Reserve .....	207,203.00	115,951.19
Temiskaming .....	56,833.00	33,804.96
O'Brien .....	88,433.01	50,964.00
Nova Scotia .....	49,010.00	31,800.00
Buffalo .....	38,938.00	22,714.54
McKinley-Darragh .....	10,327.00	6,069.37
Kerr Lake .....	7,240.25	4,381.21
Trethewey .....	5,703.66	3,238.00
City of Cobalt .....	1,618.40	1,000.00
Colonial .....	1,698.00	1,018.00
Miscellaneous .....	16,268.81	10,798.64
<b>Totals .....</b>	<b>\$1,966,924.85</b>	<b>\$1,136,677.37</b>

The shipments for the week and year in tons to date are as follows:—

	Week May 25.	Total.
La Rose .....	31.13	1,279.31
Coniagas .....	74.05	771.80
O'Brien .....		263.24
Right of Way .....		148.60
Chambers-Ferland .....	32.00	193.60
McKinley-Darragh .....	38.02	1,020.63
Nipissing .....	97.17	792.61
Hudson Bay .....		312.62
Buffalo .....		412.57
Crown Reserve .....	28.50	219.43
Cobalt Townsite .....		505.28
City of Cobalt .....		14.84
Trethewey .....		174.19
Colonial .....		41.60
Kerr Lake .....		319.66
Cobalt Lake .....		176.26
Drummond .....		300.32
Temiskaming .....		320.64
Beaver .....		132.34
Wettlaufer .....		111.21
Provincial .....		22.22
Casey Cobalt .....		24.50
<b>Totals .....</b>	<b>290.87</b>	<b>7,556.47</b>

**BRITISH COLUMBIA ORE SHIPMENTS.**

The United Copper mine at Chewelah, Wash., made its first shipment to Trail last week. The ore of this property is a high grade silver-copper ore, principally grey copper.

The Emma mine also made a shipment to Trail of ore running high in iron to determine its value for fluxing purposes.

The Lucky Boy also made its first shipment. The Richmond-Eureka made its first shipment since the big slide which tied up the railroad at the Payne tunnel.

The matte shipments were 92 tons valued at \$66,249 for the week.

The Boundary shipments were well up to the record breaking tonnage of this year. The Granby shipped 528,000 pounds of blister copper, making 8,338,500 pounds for the year to date.

The Consolidated Company's receipts are:

	Week	Year to date
<b>Rossland—</b>		
Centre Star .....	3,739	58,639
Le Roi .....	1,258	18,393
Le Roi No. 2 .....	322	11,185
Blue Bird .....		57
I. X. L. .....		12
<b>East Kootenay—</b>		
Sullivan .....	644	10,678
St. Eugene .....		401
Society Girl .....		21
<b>Slocan—</b>		
Standard .....		3,318
Van Roi .....	31	1,326
Hewitt .....	34	124
Ottawa .....		28
Eastmont .....		51
Fidelity .....		61
Apex .....		36
Richmond-Eureka .....	87	550
Rambler-Cariboo .....	26	497
Reco .....		24
Lone Bachelor .....		31
Ruth .....		259
Middleton .....		24
Molly Hughes .....		7
Lucky Boy .....	21	21
Other mines .....		228
<b>Nelson—</b>		
Arlington .....		970
Granite-Poorman .....		132
Queen .....		110
Emerald .....		880
Molly Gibson .....	74	827
Other Mines .....		132
Monarch (Field) .....	31	239
Emma (Eholt) .....	57	57
<b>Foreign—</b>		
Knob Hill .....		1,445
United Copper .....	35	35
Other mines .....		164
<b>Total .....</b>	<b>6,356</b>	<b>113,918</b>
<b>Granby Smelter Receipts—</b>		
Granby .....	25,305	464,121
<b>B. C. Copper Company's Receipts—</b>		
Mother Lode .....	8,096	147,644
Rawhide .....	5,937	70,032
Emma .....		4,650
Athelstan .....		357
Jackpot .....	357	6,912
Unnamed .....	140	3,498
<b>Total .....</b>	<b>14,530</b>	<b>233,093</b>

**GENERAL MARKET.**

Coal, anthracite, \$5.50 to \$6.75.  
 Coal, bituminous, \$3.50 to \$4.50 for 1¼-inch lump.

**Coke.**

May 21—Connellsville Coke (f.o.b. ovens).  
 Furnace coke, prompt, \$2.40 to \$2.50 per ton.  
 Foundry coke, prompt, \$2.75 per ton.  
 May 21—Tin, Straits, 45.80 cents.  
 Copper, Prime Lake, 16.50 cents.  
 Electrolytic copper, 16.37½ cents.  
 Copper wire, 17.25 cents.  
 Lead, 4.20 cents.  
 Spelter, 6.92½ cents.  
 Sheet zinc (f.o.b. smelter), 8.65 cents.  
 Antimony, Cookson's, 8.00 cents.  
 Aluminium, 21.00 cents.  
 Nickel, 39.00 to 40.00 cents.  
 Platinum, ordinary, \$45.50 per ounce.  
 Platinum, hard, \$48.00 per ounce.

Bismuth, \$1.80 to 2.00 per lb.  
 Quicksilver, \$41.00 per 75-lb. flask.

**TORONTO MARKETS.**

May 23.—(Quotations from Canada Metal Co., Toronto):  
 Spelter, 6.50 cents per lb.  
 Lead, 4.50 cents per lb.  
 Antimony, 8 to 9 cents per lb.  
 Tin, 47 cents per lb.  
 Copper, casting, 16.50 cents per lb.  
 Electrolytic, 16.50 cents per lb.  
 Ingot brass, 7 to 12 cents per lb.  
 May 23—Pig Iron (Quotations from Drummond, McCall & Co., Toronto).  
 Summerlee No. 2, \$22.50 (f.o.b. Toronto).  
 Summerlee No 2, \$2250 (fo.b. Toronto).  
 Midland No 1, \$19.75 to \$20.50 (f.o.b. Toronto).  
 Midland No. 2, \$19.75 to \$20.50 (f.o.b. Toronto).

**SHARE MARKET**

(Courtesy of J. P. Bickell & Co., May 27th.)

**New York Curb.**

	Bid.	Ask.
Braden . . . . .	6¼	6¾
B. C. Copper . . . . .	5	5¼
Butte Coal . . . . .		
Giroux . . . . .	5¾	5¾
Greene-Cananea . . . . .	9½	9¾
Inspiration . . . . .	19¼	19¼
Yukon Gold . . . . .	3¾	3½
Goldfield Cons. . . . .	4¼	4¼
Nevada Cons. . . . .	42	42½
Miami . . . . .	26¼	26¼
Ray Cons. . . . .	29½	30
Chino . . . . .	18¾	19
United Copper . . . . .	¾	1¼

**Cobalt Stocks.**

	Bid.	Ask.
Bailey . . . . .	2	2¼
Beaver Cons. . . . .	46	47
Buffalo . . . . .		155
Chambers-Ferland . . . . .	17	17½
City of Cobalt . . . . .	17	17½
Cobalt Lake . . . . .	24½	25½
Coniagas . . . . .	700	
Crown Reserve . . . . .	310	330
Great Northern . . . . .	9¾	10¼
Gould . . . . .	3¼	3½
Gifford . . . . .	4	4¼
Green-Meehan . . . . .	1¾	1½
Hargraves . . . . .	5½	6
Kerr Lake . . . . .	250	260
La Rose . . . . .	345	350
McKipley-Darragh . . . . .	175	178
Nipissing . . . . .	770	780
Nova Scotia . . . . .	No Market.	
Ophir . . . . .	8	12
Otisse . . . . .	1¾	2
Peterson . . . . .	6¾	7½
Right of Way . . . . .	9½	10½
Silver Leaf . . . . .	5½	6
Silver Queen . . . . .	2	4
Temiskaming . . . . .	39½	40
Trethewey . . . . .	55	60
Wettlaufer . . . . .	60	63

**Porcupine Stocks.**

	Bid.	Ask.
Apex . . . . .	.03	.04¼
Dobie . . . . .	.34	.38
Crown Chartered . . . . .	.16½	.17½
Dome Extension . . . . .	.35½	.36¼
Eldorado . . . . .	.04	.06
Foley-O'Brien . . . . .	.18	.25
Hollinger . . . . .	10.75	10.90
Jupiter . . . . .	.31	.33
Moneta . . . . .	.10	.15
Nor. Ontario Exp. . . . .	2.00	3.00
North Dome . . . . .	.50	1.00
Pearl Lake . . . . .	.16	.17
Porcupine Central . . . . .	No Market.	
Porcupine Imperial . . . . .	.02	.02½
Porcupine Northern . . . . .	No Market.	
Porcupine Tisdale . . . . .	.02	.02½
Porcupine Southern . . . . .	No Market.	
Preston East Dome . . . . .	.05	.05½
Rea Mines . . . . .	.35	.45
Standard . . . . .	.04¾	.05½
Swastika . . . . .	.16½	.17½
Vipond . . . . .	.40	.41
United . . . . .	.01½	.02½
West Dome . . . . .	.14	.25
American Goldfields . . . . .	No Market.	

**SILVER PRICES.**

		New York	London
		cents	pence
May	8 . . . . .	60½	27¾
"	9 . . . . .	60¾	27½
"	10 . . . . .	60¾	27½
"	11 . . . . .	60½	27¾
"	13 . . . . .	60¾	28½
"	14 . . . . .	60¾	27½
"	15 . . . . .	60¾	28
"	16 . . . . .	61¾	28¼
"	17 . . . . .	61¾	28¼
"	18 . . . . .	61¼	28¾
"	20 . . . . .	61¾	28¼
"	21 . . . . .	61¾	28¼